ACTA RADIOLOGICA

EDITA PER SOCIETATES RADIOLOGICAS DANIÆ, FENNIÆ, HOLLANDIÆ, NORVEGIÆ ET SUECIÆ

VOL. III FASC. 6 31: XII 1924 N:o 16

ROENTGEN AND LIGHT TREATMENT OF TUBERCULOUS GLANDS

Paper Read at the Third Meeting of Nordisk Forening for Medical Radiology

by

Axel Reyn

The treatment of tuberculous glands has, of recent years passed more and more from surgeons to radiologists.

This has, no doubt, been of great benefit to many patients, but, on the other hand, I do not believe for a moment that the treatment most frequently employed nowadays, viz. X ray treatment, is in all cases an ideal one. On the contrary, one can show that this treatment has in some cases not only not cured the patients but has harmed them.

One can judge the difference between the use of surgery and X rays in treating tuberculous glands formerly and now, by the fact that in 1908, 7 per cent of all operations in the clinic at Lund were for tuberculous glands, while the number in 1918 was 1 per cent only. (EDLING, Acta Radiol. Vol. I.)

WILLIAMS and PUSEY in America were the first (1902) to make use of irradiations with X rays in treating tuberculous glands, later on this method was employed in Europe, first in France (BERGONNIER), and later on in all countries. In Scandinavia the treatment was taken up by FORSSELL in 1906.

It is, however, not of great interest to find out the number of authorities who have written about the Roentgen treatment of tuberculous glands, while it is of the greatest interest to examine the results obtained in the different clinics and to find out whether X ray treatment can prove harmful to the patient. In a series of the communications, which have come in, several are without any value in judging these points, for the writers merely relate, in short form,

that they have obtained good results, not mentioning the number of patients treated in this manner. Furthermore, they do not mention whether the patients are re-examined after their final treatment or not, and they forget to mention technics. Other writers had so few cases under treatment that their statistics do not count.

In this connection I would like to draw your attention to the fact that everybody who will judge the results obtained, has not simply to be content with the results on discharging the patients. One has to watch the patients for years afterwards, for apparently cured glands can very often relapse and a closed sinus can open again, months, and sometimes years, after the final treatment. If the patients are not properly watched for a lengthy period after being cured to all appearance, statistics are, practically, without any value whatever.

Over and over again I have brought forward this opinion in discussing the cure of tuberculosis, and at the Finsen Institute we have always followed this rule and do so still.

This method is naturally laborious and requires comprehensive written and administrative work, and very few therefore make use of it; but it is of great use in judging the value of a treatment. Here I would draw your attention to the very important fact that patients, who are the most difficult to keep under observation, are just those who find that the treatment has not been beneficial or have relapsed, and therefore they very often try other clinics, hoping to be cured there. If patients, therefore, do not come to be re-examined upon written application, one has to try to get hold of them by writing a careful letter, inquiring about their health, whether cured or not?

What Results Are Now Obtained by the Different Authorities in Treating Tuberculous Glands with X Rays?

As already mentioned, there is a comprehensive literature on this subject, but I shall only touch on the articles that give fairly detailed statistics of cases treated and that render an account of the technic. Naturally there are to be found some detailed publications which I have overlooked, as it is impossible, and also quite unnecessary, to wade through the entire literature dealing with this subject. (Together with the results obtained the different writers' technics will be mentioned.)

The majority of medical writers classify tuberculous glands into

three groups, (1) the simple hyperplastic non-suppurating forms, (2) the suppurating forms, (3) the glands with sinuses.

As a rule, medical authorities find that the first group gives the best results, while the glands with abscesses or sinuses give less favourable results, but some writers have had, better results in treating the two last mentioned groups. I find it very difficult to separate groups 2 and 3 as suppurating glands often develop fistular.

Baisch (Strahlentherapie Bd. I) divides his cases into the 3 groups mentioned. He had under treatment 18 of group I, 9 being cured, 7 improved and 2 unchanged; 16 of group II, 12 cured, 4 improved; 6 of group III, 3 were cured, 1 improved, 2 without any effect, altogether 40 cases with 24 cured, 12 improved and 4 unchanged, making 51 per cent of cures. Baisch used 1 Sabouraud-Noiré filtered through 1 mm of Aluminium.

Broca and Mahar (Strahlentherapie Bd. IV) have had 79 cases *in children*. 36 were cured, 43 improved, that is 46 per cent of cures. Technics, time of observation etc. not given.

Petersen (Strahlentherapie Bd. IV) divided his cases in the same manner as Baisch. He has had under treatment 39 cases, 18 cured, making about 50 per cent. Petersen employed ordinary 1 Sabouraud-Noiré through 3 mm of Aluminium.

Kreicke (Strahlentherapie Bd. VIII) has treated 120 cases. He gives statistics for 95 who have undergone and completed treatment, 47 or about 50 per cent were cured, 42 improved. Dosis has been 10 X filtered through 1 or 2 mm of Aluminium.

Dieterich (Fortschr. auf d. Gebiet der Roentgen Bd. 22) has had 99 cases under treatment, 23 gave up treatment, 8 were still under treatment at the time of writing, of the 68 remaining, 44 or 65 per cent were cured, while 22 were improved and 2 unchanged. He filtered the light through 1 mm of Aluminium.

Iselin (Strahlentherapie Bd. X) has treated 551 cases, of these 434 completed treatment, and of these, 390 were cured, but this latter number includes the patients, who, at the period of writing, were but apparently cured, and later on Iselin states that only 272 of these 390 cases were kept under observation. Of these, 272, the number to be reckoned with, 23 per cent relapsed. The percentage of cures is, if one includes the unchanged cases, thus 63 per cent, but this percentage is, without doubt, much too high, for among the 118 cases not re-examined, there is bound to be a great number not cured, and just for this reason they have not put in an appearance.

Iselin uses following technics; children below 6 years, $2^1/_2$ H. through 3 mm of Aluminium, children between 7—15 years, $3^1/_2$ H.,

Adults 3 1/2—5 H. through 3 mm of Aluminium. After first irradiation there is an interval of 2—3 weeks, later on 3—4 weeks.

Rapp (Strahlentherapie Bd. X) divides tuberculous glands into the 3 groups mentioned; under treatment he has had 100 cases of hyperplastic glands which were nearly all cured; in treating glands with sinuses or abscesses the results are also good, but th treatment was of long duration. He fails to mention the cases in detail. He has employed 40—50 X!! through 3 mm of Aluminium or through 1/2 mm of Zinc, every fourth week. He has very seldom seen cases of Atrophy arise.

Kreier (Berl. klin. Woch. 1920 Nr. 211) has had 167 cases under treatment, 31 abandoned treatment, 35 were still under treatment, of 101 remaining, 64 cases or 63 per cent were cured; 34 showed an improvement. The dose was 20 X through 3 mm of Aluminium every fourth week; on an average he employed 5—6 irradiations.

Mahar (Archives d'électricité médicale 1913) has treated 82 cases of hyperplastic non-suppurative glands. He has cured 38, while 44 showed an improvement, of 66 cases with abscesses he has had 30 cures and 36 improvements, the percentage of cures is, consequently, 40 per cent. The technics are not mentioned.

Disson (Strahlentherapie Bd. X) has treated 203 patients, 45 gave up treatment, there remaining 158 with 98 cases or 62 per cent cures. He has employed 60—80 X!! filtered through 3 mm of Aluminium or 100 X!! through 1/2 mm of Zinc.

Hilpert (Münch. med. Woch. Bd. 69) finds that good improvement is to be had by using X ray treatment for tuberculous glands, but does not mention cures at all. The dose was 2/3 of erythemadosis through 1/2 mm of Zinc, every sixth or eighth week.

Haeker (Münch. med. Woch. 1921) gives us the following numbers. Closed non-suppurative glands 40 cases. 20 cured, 19 improved, 1 unchanged, glands with sinuses 14 cases, 5 cured, 7 improved, 2 unchanged. The percentage of cures in all cases is, consequently, 46 per cent.

Stark (Strahlentherapie Bd. XII) finds that one has to employ an erythemadose filtered through 1/2 mm of Zinc. He has observed Atrophy of the skin, but is of opinion that this can be avoided by allowing an interval of 2—3 months between the second and third irradiation; if a cure does not take place after 3 irradiations, the patient will not get cured at all. Later on, however, the writer mentions that he often irradiates more than 3 times. Of 23 patients, 7 showed an improvement, 8 were cured, while 4 showed an un-

changed state, and 4 abandoned treatment. The percentage of cures is 42 per cent.

WETTERER (Handbuch d. Röntgen- u. Radiumtherapie 1920) mentions that he has had 376 cases under treatment, showing 87,5 per cent of cures. He has watched all patients from 1/2—6 years, but he does not inform us how many of the patients were under observation more than half a year. He has had cases of relapses 38 times and in this way the percentage of cures is reduced to 72 per cent. WETTERER mentions that for curing the cases in group I, one has to use 2—6 irradiations, in group 2, 8—15. Each irradiation has to be 8—10—15 H. strongly filtered.

EDLING (Acta Radiol. Vol. I) has had 206 cases under treatment, showing 75 per cent cures. He observed relapses in 6.7 per cent. He has had the cured patients under observation from 2 to 4 years.

The technics have differed considerably. In the beginning unfiltered light was used, later on 10—15 H. filtered through 2—3 mm of Aluminium, at intervals of 3—6 weeks. For a time he employed strong doses through a thick filter, but he is now using small doses of about 4 H. filtered through 4 mm of Aluminium.

The results obtained by the different authorities differ vastly, as you perceive; the percentage of cures is swinging between 40 and 70 per cent. Nearly one half of all writers record a percentage of 50 per cent or lower, while others register more than 60 per cent of cures.

Where is this Difference in Results to Be Found?

The technic alone cannot be the cause, for the different results seem not to depend on the difference of technic. The cause has to be found, I think, in the following two facts (1) The type of the cases, (2) The definition of the word "cured"; probably a third point plays an important rôle, viz. the time in which the patients have been kept under observation after the conclusion of treatment.

As to the type of the cases, it is quite natural that if one has a series of early cases under treatment, one will then obtain much better results than if one has to treat patients for old glands of long duration. You are well aware that many cases of tuberculous glands get cured spontaneously, even if they have existed one or several months; this may be because they were not tuberculous, or because the prognosis in a certain proportion of cases of tuberculous glands, is really very good. If one, therefore, takes under Roentgen treatment all cases of tuberculous glands which

come to one, though they are perhaps of only a few days' or a few months' duration, one will naturally obtain a larger percentage of cures than one should, by rights. For many of the cases would have been cured spontaneously without any treatment whatsoever, and the cure is not due to the employment of X rays. It is the same if one has children under treatment for glands, as these disappear much more easily in children than in adults.

I am sorry to say that statistics never mention these circumstances, but undoubtedly they have in many cases been the cause for the different results obtained.

The definition of the word "cured" is certainly also very various. Some writers claim that glands have to disappear almost entirely, others are satisfied if the glands are diminished considerably, without disappearing altogether. For they are of opinion that if the glands do not diminish in size during treatment, it is due to the diseased tissue being destroyed and replaced by fibrous tissue, which is another expression for cure.

As a result of these differences of opinion one medical writer registers patients as "cured", while others would simply register them as "improved".

These two cardinal points have naturally to go together, but surely one ought to be very cautious in calling a patient cured if the glands have not entirely, or almost entirely, disappeared. They have, at any rate, only to be palpable as small freely mobile, not tender infiltrations, and even in these cases one can often see the glands swell up again, due to tuberculous infection remaining behind.

The time under which patients have been under careful observation, plays a decisive rôle in the percentage of cures, for tuberculous glands are inclined to relapse, and as relapses take place most frequently in the first months after conclusion of irradiation, one can very well understand that the percentage of cures differs considerably in the works of medical authorities, whereas one reckons on results obtained just after the last irradiation, or on results where the patients have been observed for a lengthy period.

The conclusion, generally arrived at from the results obtained by X ray treatment of tuberculous glands, is that this treatment is the only satisfactory one for this disease. I do not agree with this conclusion and later on, I shall refer to it more fully.

As to technics, it is evident from the statistics mentioned that these are vastly different at the various clinics.

This difference depends undoubtedly on the fact that no one knows which kind of technics bring about the best results. Furthermore, in some degree, the doses applied depend on the installation

which is used, and also on the numbers of patients to be treated. Doctors, who have not had modern installation for deep X ray therapy at their disposal, have consequently made use of thinner filters, and if they have had to treat a great number of patients, in order to save time, used thinner filters, even if modern installations have been at their disposal.

Later on I shall come back to these questions, but here I wish to emphasize that results, as well as technics, by the X ray treatment of tuberculous glands, are highly variable. Now I will proceed to mention the results obtained by us at the Finsen Institute.

The material under consideration is dated from 1910 to the end of 1920; I have not made use of cases treated at a later date, for I desired to have a certain extended time to observe and control all patients treated.

During the first years we had only a few cases under treatment, but after 1913 the numbers of patients increased continually, and very considerably during the last few years.

The great augmentation since 1913 is due to the fact that at that time I started treating Lupus vulgaris and different forms of surgical tuberculosis with artificial chemical light baths. Owing to lack of space we could not treat all our cases of tuberculous glands with light baths, for I found it more important to test the value of light baths in the more serious forms of surgical tuberculosis. Also many reports on the favourable effect of Roentgen rays in treating tuberculous glands have appeared in print. During a period therefore I treated hyperplastic glands entirely with X rays; and only in very serious cases, and cases complicated with abscesses or sinuses, did I employ light baths, often along with X rays. In the fistulous forms I employed nearly every time local treatment as well, *however as soon as accomodation permitted, I used in nearly all cases and in almost all forms of tuberculous glands, light baths together with X rays, I also treated the fistulous forms with concentrated chemical light, for I found, that I thus obtained much better and quicker results.*

In regard to the kind of material under treatment, I shall mention that the majority of cases, especially those treated during the first years, were serious affections of very long duration; many of the patients had been treated for many years, prior to their coming to the Institute; and about half the number of the cases had been operated on several times without being cured, often the only result was the development of sinuses in their non-fistulous glands. About 74 per cent were under treatment more than 6 months, and 59 per cent more than 1 year (see Table I).

Table I. Duration of illness (given in months) and former treatment of cases treated

	Duration of illness						Former treatment			
	Number	On an average	Least	Greatest	Under 6 months	Under 1 year	Operation	X rays	Seaside hospital	Other forms of treatment
I. Light alone										
a. Adults	44	94	3	344	6	10	33	3	1	5
b. Children	33	29	1	156	11	19	16	1	5	19
II. Light baths and X rays										
a. Adults	80	73	3	300	17	26	47	4	7	25
b. Children	28	36	6	120	5	11	11	1	4	13
III. X rays and local light treatment										
a. Adults	87	56	1	500	27	37	51	2	5	36
b. Children	45	25	1	120	10	22	13	1	3	29
IV. X rays alone										
a. Adults	149	70	1	400	39	63	40	2	10	104
b. Children	50	24	1	132	20	24	9	1	6	38

Total number of patients 629, 76 gave up treatment; of the 553 remaining (376 adults, 177 children), 480 got cured, out of this number, 18 relapsed and we have recommenced treatment (see Table II).

Table II. Patients suffering from tub. glands

Total number	Abandoned treatment	Remainder	Cured	Relapses
629	76	553	480 = 86.6 p. c.	16

The circumstances in the different kinds of treatment are the following:

	Number	Cured	Improved	Unchanged	Relapse	Cured later
I. Light baths and local light treatment	81	80 = 98.7 p. c.	1 = 1.3 p. c.	0	1	1
II. Light baths, local light treatment and X rays	113	105 = 92.9 p. c.	6 = 5.3 p. c.	2 = 1.8 p. c.	7	3
III. X rays and local light treatment	112	94 = 83.9 p. c.	12 = 10.7 p. c.	6 = 5.4 p. c.	8	—
IV. X rays alone	247	97 = 39.3 p. c.	109 = 44.1 p. c.	41 = 16.6 p. c.	—[1]	—

[1] No relapses for these are registered in "unproved" or unchanged column.

NB. Of cases, either "improved" or "unchanged", after X rays and local light treatment, 13 patients later on got light baths, 12 of these were cured and 1 is still under treatment. Of cases, either "improved" or "unchanged" with X ray treatment only 40 later on underwent local light treatment, 39 were cured.

Of cases, either "improved" or "unchanged", treated by X rays only, 53 later on underwent light bath treatment, all were cured, but there were two cases that relapsed.

From the preceding figures it is evident that my material has to be divided into 4 groups.

I. Patients treated with light baths.
II. Patients treated with light baths along with X rays.
III. Patients treated with X rays and local light treatment (only cases with sinuses).
IV. Patients treated solely with X rays.

Concerning the different groups, I beg to draw your attention to the fact that the most serious cases are to be found in groups I and II, most of these patients had large, serious gland tumors; more than half the number of cases in these two groups had been operated on previously without any results (see Table I). Group III contains mainly fistulous glands, among these there were naturally some serious cases, but on an average these patients were less attacked, often with only single fistulous glands. Group IV comprises mainly hyperplastic non-suppurative glands, and these cases were, on the whole, less serious than those in groups I and II, only 24.6 per cent had previously been operated on.

If we now examine the results obtained amongst the different groups, it is quite natural to begin with group IV, patients treated entirely with X rays.

In Table II you will find that 247 patients are in this group. 97 cases or 39.3 per cent were cured, this number is one of the lowest among all statistics mentioned.

How Is It that I Have a Lower Percentage of Cures than Wetterer and Edling?

To explain this is naturally difficult, but I shall endeavour to show the causes.

Firstly, there is no doubt that my cases, on the whole, have been more severe than those of the two writers above-mentioned. At the Finsen Institute we had as already mentioned, in the first years, under treatment only such cases as were given up entirely

by surgeons as being beyond operation, furthermore we have hardly ever treated glands of less than 3 to 4 months duration, even if we have met with such cases, which has often happened in recent years. We are of opinion that such fresh cases often cure themselves spontaneously. If I had taken such early cases under treatment, I am sure that my list of cures would have been far higher. On an average the disease in my cases has had a duration of 6 years in adults and 2 years in children in this group (see Table I).

A great deal depends also, on the definition of the word "cured". I have never regarded a patient as cured, unless the glands have disappeared almost entirely, or the remaining infiltration has been slight, freely mobile and not tender.

One might well ask whether my technic has been faulty, but that is not the reason, for except in the beginning, when I employed only small doses, I used about the same doses as WETTERER and EDLING. Later on I shall refer more closely to the question of technics.

I have not noticed relapses in this group, these are to be found in the improved cases. It has always been my principle to keep in close touch with my patients for a long period, and I have often seen glands that have apparently almost entirely disappeared, simply re-appear in their full size some months later. Such cases are, in reality, not relapses, they are only a flashing up of non-cured processes. Moreover new glands often break out beside the irradiated ones.

If one will draw any conclusion from the results, which I, and also many other authors have had in treating tuberculous glands by X rays, I find that the results are by no means so good as one would imagine considering how much they are praised. Before going into this matter, I want to emphasize that the value of a method is not to be judged merely by the results obtained, but also by the risk patients run when under treatment. I find that Roentgen treatment is a considerable danger to patients.

To judge this question properly it is necessary first to mention the technics of X ray irradiation.

In the early stages, unfiltered X rays were used and to obtain a sufficient dose in the depth of the tissue, it was necessary to use such large doses and so one ran the risk of burning the patient, and cases in which a Roentgen ulcer broke out were by no means uncommon.

After the introduction of the hard penetrating rays, filtered through metals, the opinion arose that this risk was excluded, unless very large doses were employed, and to get as powerful an effect as possible in the deeper tissue, the dose was increased very considerably.

Doctors being of opinion that no harm would occur, if one did not come up to or exceed the so called erythemdose, which was found out by experimental experiences.

Unfortunately this view is quite erroneous, and many of the doses generally employed have the power of causing serious changes in the skin.

The reason of this misunderstanding is mainly that the alterations of the skin, produced by filtered X rays, appear late, even weeks, months and years after conclusion of treatment, *and I hold that one can still say that the late alterations of the skin after hard X rays are far from being attended to as they should.*

In order to throw light upon these circumstances, I shall first go through my own material.

Among 472 patients treated with X rays, changes to the skin after X rays have been observed in no fewer than 101 cases, and this number is bound to increase gradually in years to come, for I maintain that these alterations can occur many years after the last irradiation.

My technic has been as follows:

During the first years of my work with X rays in tuberculous glands, I employed very weak doses frequently, but after a short time I began to filter the rays through 4—6 mm of Aluminium and a piece of leather. The dose was generally 5 H., repeated every fourth—sixth week, later on I, unfortunately, increased the dose to 10—15 H. through 5—6 mm of Aluminium, being influenced by the different communications on the better results obtained by employing stronger doses. The interval between each irradiation was, at the same time, increased to 5—10 weeks, often more. Once I employed 20 H. through 6 mm of Aluminium, or $^1/_2$ mm of Zinc. Irradiation was repeated several times, sometimes even up to 10 irradiations, I very seldom employ more than this number, if 10 H. or more were used.

If we now examine under which doses alterations to the skin arose, we will see that these can take place, both after very few irradiations with doses of 10 H. or higher, and also after comparatively slight doses as 5 H., if these ones are repeated. I have, for example, seen pronounced Atrophy and extended Teleangiectasia after 5 irradiations of 5 H., each through 3 mm of Aluminium, there was an interval of 2 months between each irradiation; I have observed just the same alterations of the skin after a single treatment of 15 H. through 5 mm of Aluminium, and Teleangiectasia without Atrophy have appeared after 2 irradiations of 10 H. each through 5 mm of Aluminium (interval between the irradiations 7 weeks).

Naturally these doses, very seldom, produce alterations of the skin, and the skin can stand even stronger doses. For example, I have irradiated patients with 10 H. through 5 mm of Aluminium, repeating this dose 1 month and 3 months later, and furthermore they have got 15 H. through 5 mm, 3 and 2 months later, respectively, and no change in the skin could be observed.

The different individuals seem thus to have different sensibility to X rays, a fact difficult to explain. However I should like to draw attention to the fact that patients who have a skin, previously red and filled with blood are much more sensitive to X rays, than patients with, what I should term, a normal skin.

Furthermore great stress must be laid on the state in which glands are when treated. If, for example, glands have much periglandulous infiltration, and ruddiness of the skin is observable, then the skin has much less power of resistance to X rays, and X rays will then cause injury much more easily than if the glands are still mobile and without any sign of inflammation.

Examples of Roentgen Changes in the Skin

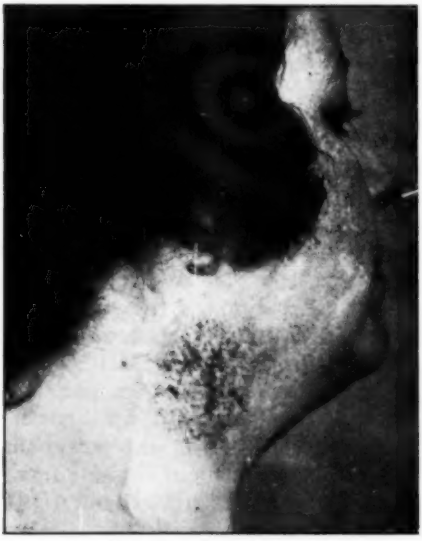


Fig. 1. Number 11199.

$^{1}/_{9}$ 1919. 10 H. through 4 mm of Aluminium.
$^{15}/_{10}$ 1919, $^{11}/_{2}$ 1920. 15 H. through 5 mm of Aluminium.

On the 30th of March 1921 more than 1 year after conclusion of treatment Teleangiectasia after X rays were observable for the first time. These Teleangiectasia became more and more prominent, and Atrophy of the skin appeared. Photograph shows condition of patient on June 1st 1923.

Fig. 2. Number 10885.

Fig. 3. $^{6}/_{1}$ 1921. Number 9777.

Fig. 4. $^{2}/_{2}$ 1923. Number 9777.

$^{21}/_{2}$, $^{26}/_{4}$, $^{22}/_{7}$ 1918 and $^{4}/_{1}$ 1919. 15 H. through 5 mm of Aluminium.

On June 27th 1921, eighteen months after conclusion of treatment, Teleangiectasia were to be observed and Atrophy of the skin occurred. The change developed more and more and on Oct. 9th 1922 the aspect of the patient is as shown on the photograph.

$^{30}/_{5}$ 1918. 5 H. through 3 mm of Aluminium.

$^{11}/_{6}$, $^{27}/_{7}$ 1918. 10 H. through 4 mm of Aluminium.

$^{23}/_{9}$ 1918, $^{9}/_{1}$ 1919. 10 H. through 5 mm of Aluminium.

$^{5}/_{4}$, $^{17}/_{12}$ 1919. 15 H. through 5 mm of Aluminium.

On the 9th June 1920, 6 months after conclusion of treatment, Teleangiectasia were observed for the first time and changes of skin developed more and more.

The photographs show the state of the patient on June 6th 1921 and Febr. 2nd 1923. This patient was not cured by X rays, but only after light treatment.

Fig. 5. $^{6}/_{1}$ 1921.

^{8} 11 1919. 10 H. through 5 mm of Aluminium.
$^{18}/_{12}$ » 15 H. through 5 mm Aluminium.

Fig. 6. $^{24}/_{2}$ 1923.

On Jan. 14th 1920, that is 1 month later, a Roentgen reaction was to be observed, developing more and more until a deep ulcer was formed, and in Dec. 1920, the patient was as shown on the photograph. Severe bleeding started, undoubtedly caused by erosion of a large artery. Bleeding stopped only after the external Carotitid was bound. The wound healed by local light treatment with concentrated carbon arc-light in the course of a year.

It would be of the greatest interest if one could determine which doses contain danger for Atrophy and Teleangiectasia.

This is, however, impossible, for many unknown circumstances play a great rôle, quite apart from the dose itself. So much can however be laid down, that the danger for alterations to the skin is great, as soon as we employ 10 H. or more, for I have seen many patients who have sustained injury to the skin after 2—3 irradiations, even if the interval between each treatment was 6 weeks or more, up to 2 to 3 months. (When employing these doses I have always filtered the rays through 6 mm of Aluminium.) The risk seems to be diminished considerably, if doses of 5 H. filtered through 4—5 mm of Aluminium are used, and in these instances I think that the skin can stand 8—10 irradiations, if the interval between each treatment is not less than 5—6 weeks, but I would emphasize,

that one is never sure of not injuring the skin, even if the greatest caution be used. I regret to say that we know exceedingly little about the effect of X rays on the skin, and I still consider the X ray therapy as a therapy which is not lying on a firm basis. I am of opinion that for many years to come we will be unable to work surely and safely with X rays. You will perceive that the risk of skin Atrophy in Roentgen irradiation is far from being inconsiderable, even if small doses are employed, and the reason of my having been free from even more disagreeable accidents is due to the fact that almost all our patients suffering from glands, complicated with sinuses, have been treated with concentrated chemical carbon arc-light (Finsen-treatment). This treatment counteracts to a great extent Roentgen Atrophy of the skin, and we have succeeded in remedying the injury already produced in other patients by treating them with concentrated light.

We should, therefore, be quite clear in our minds that the doses, hitherto regarded as permissable, may be of great danger to the skin, and in treating tuberculous glands, one has to take this into account. This may be of vital importance to patients, whenever »late ulcers» of the skin break out, especially if the latter is exposed to any injury, and if such a patient has to be operated on for his glands. He may be placed at a great disadvantage, for it may happen that the wound after operation will not heal up and serious gangræne may arise.

During the last years, therefore, I have diminished the doses in treating tuberculous glands with X rays, and now I never employ more than 5 H., through 4 mm of Aluminium, and I fix an interval of about 5 weeks between each irradiation. Perhaps it would be safer to diminish the dose still more by making use of but 3 H.

Regarding the case of children I should like to emphasize that the greatest care has to be exercised, for, as you are aware, children's skins are much more sensitive than those of adults to X rays, and furthermore one runs the risk of restraining the growth of the young tissue. It has been maintained that this risk is negligable with the doses generally employed; but I consider this to be incorrect and I have myself seen such restraining of the growth of the tissue. I hope to come back to this question in a later paper.

If one goes through the numerous articles on the Roentgen treatment of tuberculous glands, one is astonished to see how seldom these dangerous circumstances are mentioned, and I am sure that

many of the patients treated with X rays have both Atrophy and Teleangiectasia, and if the doctor in charge has not observed this, the reason is due to his not watching the patients over a long period. Amongst the few writers who have mentioned alterations to the skin in their patients, one is bound to mention Dr. EDLING.

To give an idea of how little regard many authorities place on the injurious effect of Roentgen rays on the skin, I should like to mention some of the doses which have been employed and recommended, in many cases. Serious Atrophy must have arisen, unless the measuring of the dose has been incorrect.

RAPP in his article gives his dose to be 40—50 X through 3 mm of Aluminium, every fourth week. DISSON employs 60—80 X through 3 mm of Aluminium or through 1/2 mm of Zinc. HILPERT, who reports improvements only and no cures, applies 2/3 of an erythema dose through 1/2 mm of Zinc every 6—8 week. STARK, who uses 1 erythema dose through 1/2 mm of Zinc, mentions that he has observed cases of Atrophy, but he is of opinion that this can be avoided in allowing intervals of 2—3 months between each irradiation. WETTERER applies 5—10—15 strong filtered rays up to 15 times. Thus I could continue mentioning publications where the writers inform us about doses employed, which in my opinion are far high.

Do Strong Doses Give Better Results than Small Ones?

Apparently the doctors who make use of comparatively small doses have just as favourable results as those who employ strong doses.

ISELIN and EDLING, who have a proportionally high percentage of cures, have gradually brought their doses down to less than 5 H., filtered through 3—5 mm of Aluminium. Regarding my own cases I am of opinion that no better results are to be expected when employing strong doses than when using weak ones. This is evident from Table III, where the numbers of cases, along with the different doses, are shown.

Concerning this Table, I have to emphasize the fact that the cases treated with strong doses have been by far the most severe. But one can see from this Table that the small doses have just as good an effect as the strong ones.

Table III

	Number	Cured	Improved or unchanged
Small doses (5 H. through 3—5 mm of Aluminium)	95	45=47 p. c.	50
Moderate doses (10 H. through 5 mm of Aluminium)	66	28=42.4 p. c.	38
Strong doses (10—15 H. through 5—6 mm of Aluminium)	86	24=28 p. c.	62

Experimental experience shows that there is great uncertainty in the mode of action, value and dosage of X rays in Roentgen therapy of tuberculosis.

Dr. STEPHAN, of Freiburg, has written a long paper in »Strahlentherapie», on the rise of the cell power by means of Roentgen irradiation, he maintains that it is a great error to augment the doses of X rays through the help of strong filters, in order to destroy the granulation tissue directly.

He is of opinion that the results of treating tuberculous granulating tumors with strong filters Roentgen rays are much inferior to those obtained before filtering came into use.

Dr. STEPHAN finds the cause of this to be that in using the old technics without, or with only very slight filtering, we had to employ only a small dose of X rays on the glands, and we could only apply a dose, less than the skin erythemdose. After we made use of the strong filtered rays, we were able to increase the dose in the depth of the tissue considerably, up to 9 times.

In experiments with patients, suffering from tuberculous glands, he holds that the small doses give better results than the strong ones; and he emphasizes the fact that if he does not obtain a cure when employing small doses, he will never obtain one by using strong.

He explains this as follows: the epitheloid cells in the tuberculous lesion have the function of destroying the tubercel bacillus. To destroy the epitheloid cells is, consequently, quite wrong; one has to try to stimulate these cells, for in this way, one brings about a rapid cure, in exactly the same way as it occurs naturally.

The small X ray doses bring about this stimulation, while the strong doses retard it. He lays stress on the point that the best dose to apply is 10 per cent of an erythema dose, filtered through large filters. One must wait 14 days to see the effect of this dose, at first, later on for longer periods.

He is of opinion that it is quite useless to irradiate a gland complicated by abscess formation, if one does not remove the pus

that contains only dead cells. On the other hand, if the pus is removed, one is able to mobilize the epitheloid cells in the walls of the abscess.

RITTER and MEUVE (Hamburg) have, at a later date, undertaken some experiments on rabbits infected by tuberculosis. They are of opinion that they have confirmed STEPHAN's theory, and furthermore, they have pointed out that X rays are without any effect on tubercel bacillus. This fact also goes to prove STEPHAN's observations.

To a great extent these observation are still to be verified, but it is evident from them that X ray treatment of tuberculosis is on a very uncertain base.

Which Forms of Tuberculous Glands Give the Best Results by X Rays Treatment?

Many medical authorities find that hyperplastic forms give, by far, the best results, but on going through statistics, one finds just as often better results in the glands complicated with abscesses or sinuses, and so one gets the impression that there is no difference in these cases.

In treating fistulous glands my own results have been extremely poor.

Only 2 out of 26 cases (Table IV), have been cured, but it must be remembered that the treatment of fistulous glands by X rays alone has not been carried out so energetically as in the other forms. I soon observed that by combining X rays with concentrated chemical carbon arc-light in these cases, I obtained far better results, the sinuses closed more quickly and safely. In this connection I should like to draw your attention to the fact that X ray treatment of hyperplastic glands very often causes suppuration of the glands: many doctors think this advantageous as it brings about a quicker cure. I do not agree with this view, for the result of the suppuration is very frequently a sinus, and this often causes an ugly scar. In this way 37 out of 197 glands, originally solid and closed, turned out fistulous.

From this I think I am entitled to maintain that the results of X ray treatment for tuberculous glands are by no means so brilliant as they are said to be, for it is quite clear from statistics that a great number of these patients do not get cured at all. Concerning the conception of »improved» I would state that this is of but little value, it signifies mainly that the glands are diminishing in size. In reality the patient has not got rid of his disease, which, at any time can become worse and be the cause of serious complications.

Furthermore one must remember that the risk patients run by X ray treatment is not inconsiderable, especially if a strong efficient scheme is used during a long period. This will very often produce a severe atrophy of the skin and even produce deep ulcerations many years after the treatment. If the glands break out again or become suppurating, the patient is in a very bad fix, for any treatment is most difficult in a tissue atrophied by X rays. This risk has to be taken into consideration if one wishes to examine the results obtainable by X rays irradiation of tuberculous glands. The value of this treatment is considerably diminished by this risk, and one thing is quite certain that the time is now past, when it was considered right to employ strong doses of X rays for this disease. The risk is much too great, even if the rays are very strongly filtered.

The satisfaction to be found in X ray treatment of this complaint, is chiefly due to the contrast of the poor results so often obtained by operations. The fact that out of 553 patients treated with operation, about half were uncured — although many of them had several operations — shows that surgery, at any rate, frequently fails, either because the patients come under treatment too late or because the case has been so severe from the very beginning that a good result is impossible. That the patients often come too late under surgical treatment, can surely be dismissed, when it is a case of a single isolated gland. In such cases I believe that an early operation can give a good result and I have observed good cosmetic results in some of these cases.

It has often been emphasized that irradiation with X ray gives a better cosmetic result than surgery, but I am of opinion that Roentgen Atrophy with extended Teleangiectasia, leaves a much uglier mark than a linear scar after an operation.

To sum up I am of opinion that X ray treatment is far from being an ideal treatment of tuberculous glands, and that other methods at our disposal should be placed in the foreground.

We have then to direct our attention to light baths treatment, either with sun or with artificial light sources, principally carbon arc-lamps. Furthermore treatment with concentrated chemical carbon arc-light is of considerable value in treating glands complicated with sinuses. By these treatments alone or combined with X rays in small doses, brilliant results are obtainable. One has to draw attention to the fact that small surgical undertakings often shorten the treatment considerably, later on I shall come back to this point.

Thus on examining Table I you will find that I, at the Finsen Institute, have treated 81 patients with light baths and local light treatment simultaneously (the last mentioned has only been em-

ployed for glands with sinuses), of these 81 patients 80 were completely cured, and there was but 1 relapse, which later on was also cured.

In combining light baths, local light treatment, and X rays I have obtained 105 cures out of 113 patients. In giving local light treatment and X rays simultaneously, 94 out of 112 patients were cured. Concerning these two groups, I have already emphasized that the *cases* in groups 1 and 2, taken altogether, have been much more severe than those in group 4 (the cases treated entirely with X rays), and notwithstanding this we have obtained a percentage of cures of 98,7 and 92,9 per cent, while I have to register but 39,3 per cent of cases with X rays alone.

If we take group 3, X rays combined with local light treatment, the percentage of cures is 83,9 per cent.

These figures show the enormous value of light in curing tuberculous glands, this is also evident from the fact that I succeeded in curing, by local light treatment, 39 out of 40 patients, who had been refractory to X ray treatment alone. Also we succeeded in curing with light baths 12 out of 13, who did not get cured by X rays and local light treatment simultaneously and 53 out of 53, who would not heal by X rays alone.

Only by employing chemical light did I succeed in getting a collective percentage of cures of 86,6 per cent out of all patients who underwent complete treatment.

If we had employed light baths in the treatment of all patients from the very beginning, the percentage of cures would certainly have been higher. A number of the patients who did not get cured by X rays had lost patience and would not undergo an other treatment with light baths. The cases classified in Table IV show that the effect is best in cases complicated with sinuses or abscesses, for, of these cases 160 were treated in the the first groups and out of these 157 cases or 98,1 per cent were completely cured, while out of 34 non-suppurative cases, only 28 cases or 82,3 per cent were cured.

The cause of this is, no doubt, to be found in the fact, that glands which clinically do not seem to be suppurative, often contain necrotic tissue in the form of solid caseous masses. This caseous tissue is very often inclosed in a capsule, and reabsorption of the pus is, therefore, impossible. Consequently these glands will not be diminished, even if treated by X rays or light.

If such a gland is to disappear, one has to exstirpate the gland or incise or scrape it. I hold exstirpation to be the best way out of the difficulty. In a few cases I have undertaken exstirpation of

Table IV. Kinds of cases treated by the various methods

	Number	Fistulous	Suppur. Later fistul.	Non suppur. Later fistul.	Adults	Children
I Light baths and local light treatm.	81	61 (Cured 61 = =100 p. c.) . .	5 1 (Cured 5 = =100 p. c.) . .	15 1 (Cured 14=93 p. c.) .	45	36
II Light baths and Roentgen . . .	113	82 (Cured 79 = =96.3 p. c. .	12 5(Cured 12 = =100 p. c.) . .	19 5 (Cured 14=73.7 p. c.)	84	29
III Roentgen and local light treatm.	112	106 (Cured 88 = =83 p. c.) . .	4 4 (Cured 4 = =100 p. c.) . .	2 2 (Cured 2=100 p. c.) .	70	42
IV Roentgen alone	247	26 (Cured 2 = =7.7 p. c.) . .	27 21 (Cured 4 = = 1.5 p. c. .	194 37 (Cured 91=47.4 p. c.)	177	70

	Total number	Cured
Adults	376	311=82.7 p. c.
Children	177	169=95 p. c.

such glands and have confirmed the statement that they contained caseous pus enclosed in a thick capsule of fibrous tissue.

One might ask the question as to whether an operation should not be undertaken at once but, one has to remember that very often with a patient with many glands all but one are cured by conservative treatment.

Concerning the fistulous and suppurative glands I have to emphasize that, in case of glands with sinuses, a cure is obtained much more rapidly if one scrapes the sinus, or cauterizes with carbolic acid. The suppurative type have very often to be punctuated and the pus to be aspirated, or a small incision may be made on the lowest part to get the pus out. Then the gland must be treated as a fistulous one.

Such a slight incision causes practically no scar and is in many cases, to be preferred to aspiration, and very often these cases cannot be cured by aspiration.

A question of great importance is the duration of treatment and it must be said that the treatment on the whole does take rather a long time.

Table V shows that the treatment for cases in group I lasted on an average 4,8 months, for the cases of group II, 7,7 and of group III, 9,7 months.

The patients have during this period to come for treatment every day, or every other day, this is naturally a great inconvenience, but considering the excellent results obtained, this inconvenience is of little importance.

Table V. Duration of treatment given in months, for ›cured‹, ›improved‹ and ›unchanged‹

	Cured				Improved and unchanged			
	Total number	Average	Least	Greatest	Total number	Average	Least	Greatest
I Light alone	80	4.8	1	24	1	8	—	—
II Light and X rays	105	7.7	1	36	8	24	10	36
III X rays and local light treatment .	94	9.7	1	36	18	13	2	48
IV X rays alone	97	8.9	1	36	150	9.6	1	42

The Roentgen treatment has, as regard to this point, an advantage, for the intervals between irradiations are longer. But it must be remembered how much less favourable the results are of this treatment in comparison with those of light treatment, and more over the danger of Roentgen treatment must be remembered. Light baths on the contrary have an advantageous influence on the organism, and I am in no doubt whatsoever, as to which of these two forms of treatment is to be preferred. One might ask whether X rays have been employed with sufficient energy on patients treated solely with Roentgen rays. That this is so is evident from Table V, which shows that the duration of treatment for the unchanged and improved cases has been 9,6 months.

The numbers in Table V confirm my previous remarks concerning the great value of employing light baths in curing tuberculous glands. The treatment of patients who have undergone light baths has been on an average 4,8 and 7,8 months respectively. On the other hand the duration of treatment for group 3 (X rays and local light treatment) has been 9,7 months. This last group contains entirely fistulous glands, which most medical writers find take longest to cure. There is therefore nothing peculiar in the fact that the number is on an average high; group 1, as well as group 2, contain a considerable number of glands with sinuses, and as a rule much more severe cases than those in group 3. The duration of treatment in group 1 and 2 is, however, on an average much less than in group 3.

Some medical authorities have laid stress on the point that in irradiating the glands with X rays, not only the palpable glands, but also the invisible ones are treated, while the surgeon is able to exstirpate the palpable glands only; consequently relapses are bound to appear more frequently after surgical treatment, because these invisible tumors break out after a shorter or longer period.

This is quite correct, for, in irradiating with X rays, one treats an extended field, the rays penetrate into the depth of the tissue. On the other hand, it has to be emphasized that one cannot be sure of irradiating all diseased glands, for only the fields where glands are to be seen or palpable are treated. The fields which have not been irradiated can very well contain invisible tuberculous glands. Medical writers maintain, however, that in destroying diseased cells, the X rays form antibodies that cure non-treated tuberculous glands.

Whether this theory be correct or not we do not know. When glands appear at some distance from the irradiated ones, sometimes they disappear without being irradiated, but more often these new glands break out during treatment.

This point is of vital importance in treating tuberculous glands, for the patient has, without doubt, in nearly every case to be considered as an individual affected with tuberculosis, consequently he must be treated generally not only locally, if there is to be the slightest chance of effecting a permanent cure.

As already mentioned some doctors hope to obtain this effect by forming antibodies by X ray irradiation, but it is very doubtful if this opinion is correct, considering the very poor results and the many relapses after X ray treatment. Though there is doubt about the value of X ray irradiation there is none about that of light baths, for we have so many statistics at hand, showing the cure of different forms of surgical tuberculosis by light baths (sun- or artificial light), that this has to be considered as a fact. Light baths have the power of curing tuberculosis through a universal effect on the organism as a whole. Also for this reason, I consider that light bath treatment is a far more ideal treatment for tuberculosis glands than X ray treatment.

I am not of opinion that the light bath is to be the sole treatment for tuberculous glands, we have, on the contrary, to make use of all remedies at our disposal, so as to cut short the treatment I maintain, that the combination of light bath and X ray treatment brings about a much quicker result than light baths alone, but all risk to the patients undergoing X ray irradiation must be avoided. Only small carefully filtered doses (3—5 H. through 4—5 mm of Aluminium) have to be employed, the irradiations must not be repeated too many times. There should be long intervals, about 5 weeks, between irradiating.

With patients who cannot give much time, one can try Roentgen treatment alone, but if no effect is soon obtained, light baths should

be employed. If possible, a number of light baths have always to be used with the object of avoiding relapses.

If the glands should suppurate, surgical treatment is indicated. One can try to aspirate the pus, but if abscesses are formed, it is advisable to incise them, making but a very small opening. Then treat the cavity with nitrate of silver or carbolic acid, and in some cases scrape the cavity out. A single, isolated, not too extended, freely mobile, gland can be exstirpated. If the operation is carried out properly, the scar will hardly be visible.

These patients operated upon should if possible undergo light bath treatment after the operation. We are treating not merely tuberculous glands but an individual suffering from tuberculosis.

If one follows all these points one will treat this disease properly. I should like to emphasize the fact that a great number of the patients I have had under treatment have been adults. Not less than 376, that is 68 per cent were more than 15 years of age, while 177 only, that is 32 per cent were children, and in treating tuberculous glands the best results are to be had in cases of children; just as in treatment of other forms of surgical tuberculosis. This is, evident from Table IV, the percentage of cures in cases of children is 95 per cent, while the percentage in cases of adults is 82,7 per cent. These considerations increase the value of my results.

The number of relapses is very slight (see Table I) but naturally I am aware that more relapses may arise later on, for it is a well known fact that tuberculous glands may relapse years after being apparently cured. I must here state that my results are not the results obtained at the conclusion of treatment, the patients are kept under observation for a long period after the final stages of treatment, as may be seen from Table VI.

Table VI. Times of observation for patients cured

Under 1 Year	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years	8 Years	Total	Deaths
28	21	38	99	85	101	51	26	13	462	27

413 have consequently been under medical observation and control for a period of 2 years or longer.

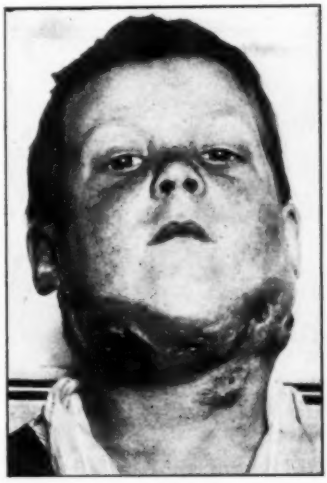
413 of the patients cured have been observed for two years or more and 276 have been examined 4 years or more after conclusion of treatment, therefore I believe that the number of relapses will be very small.

The results I have obtained in treating tuberculous glands by light baths have been duly confirmed by other medical authorities.

BERNHARDT (Neue deutsche Chirurgie, Stuttgart 1923) the first to make use of sun baths in the treatment of surgical tuberculosis has treated 106 cases of tuberculous glands with sun, they are all cured. He mentions that he has undertaken surgical operations in only *51 cases*, these were also cured; this shows that surgery in right-hands and in cases adapted to surgical operations can also give good results. In discussing this matter with Dr. BERNHARDT he emphasized the fact that he prefers light baths treatment in surgery, and furthermore that light baths are in many cases the only treatment to be employed.

ROLLIER also records excellent results in tuberculous glands (Die Sonnentherapie 1924).

Photographs of Patients Cured



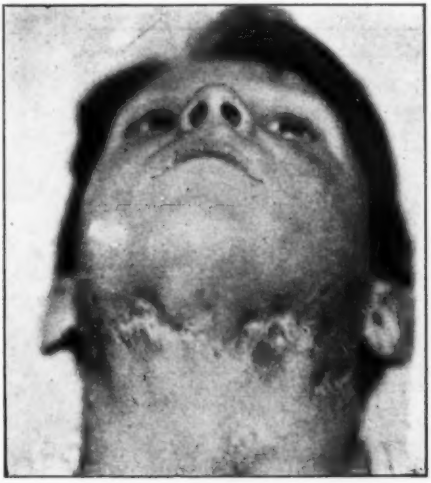


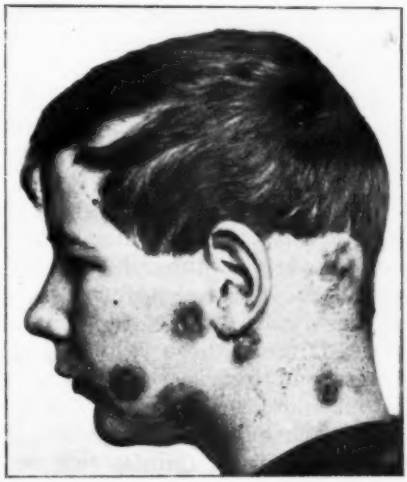
Fig. 7. Number 9435 Fig. 8.

A boy 8 years old, suffering from glands for a period of 5 years, treated at a seaside hospital, 2 1/2 years running, showed improvement but an extensive relapse came on very shortly afterwards.

Treated with light baths and local light treatment
Light baths from 17/8 1918—26/9 1919, 157 light baths
» » » 25/4 1921—22/6 1921. 21 » »
Cured. Last observation was 20 Aug. 1924.

Figs. 9—12.

Number 11443. Suffering from glands for 5 years, three years ago treated during 11 months at a hospital, undergoing several operations without obtaining cure.
Treated with light baths and X rays.
$^{3}/_{6}$ 1919—$^{24}/_{10}$ 1919, 41 light baths
Roentgen $^{13}/_{5}$ 1919 15 H. through 5 mm of Aluminium
» $^{27}/_{8}$ » 15 H. » » » » » »
Cured. Last observation was March 1st 1924.



Figs. 13—16.

Number 7372. Young man of 17 years, suffering from glands for 14 years, treated at a seaside hospital, undergoing several operations.

Treated with light baths and local light treatment

$^{2}/_{6}$ 1916—$^{9}/_{3}$ 1917 160 light baths

Cured. Last observation $^{27}/_{4}$ 1924.

Texier (Fortschritte auf dem Gebiete der Röntgen, Bd 21) lays stress on the fact that the combination of light and X rays gives the best results.

In Denmark we are well acquainted with the excellent results obtainable in children at Refsnæs (Rolf Hertz and Juelsminde (Collin, Ugeskrift for Læger 1916). In some of the sanatoriums belonging to the National Union, where artifical light baths are installed, good results are recorded (Oldenburg, Begtrup-Hansen.)

Conclusion. I consider that one or two seaside hospitals for cases of surgical tuberculosis should be built and in these hospitals patients showing severe forms of tuberculous glands should be received. In these hospitals more favourable and quicker results could be obtained than those which I have had, for the crisp air devoid of mist and fog, sea-baths etc. play, without any doubt a most important rôle in bringing about a successful cure. Another very important reason for having such hospitals, is that patients with fistulous, pusforming glands, can undoubtedly infect persons living and working with them, and such patients could, in a seaside hospital, be isolated during the period of infection. Also a point not to be overlooked is that seaside hospitals could make use of the highly beneficial light of the sun during the summer months instead of using artificial light, which will have to be at their disposal for use during the absence of sunlight. As you are aware, we have a lack of sunshine in northern lowlying countries.

In the case of children, this point is of even more importance, but in Denmark we have Refsnæs and Juelsminde and the sanatoriums of Nationalforeningen (National Union) open for children. Not less important than the treatment of tuberculous glands is Prophylaxis, and it would be of the greatest value, if persons suspected of suffering from tuberculosis could have light baths (sun or artificial): In a great number of cases I have tried this, and it is most astonishing to observe the vast improvement of these patients, both mentally and bodily.

Based on the foregoing remarks I find that the following *conclusions* can be drawn:

1. Light baths (sun or artificial light), especially carbon arc-light, are one of our principal remedies in treating tuberculous glands.

In the fistulous forms, treatment with concentrated carbon arc-light (Finsen treatment) is of very great value.

2. X ray treatment is to be employed only in such small doses, that one is quite sure of causing no harm to patients. X rays as the principal treatment gives very inferior results therefore a combination of X rays, and light baths, is necessary.

3. In treating tuberculous glands all therapeutic remedies at our disposal, light, X rays and surgical operations, have to be employed.

4. A patient suffering from tuberculous glands is to be considered as an individual affected with tuberculosis, and consequently, to be treated, not merely locally but also generally, and for this latter purpose, light baths are of the very greatest value.

5. Seaside hospitals should be laid down, not only for children, but also for adults.

6. Light baths preferably combined with a stay at the seaside, should be made use of in the fight against tuberculosis. As a preventive remedy this is of the most vital importance.

SUMMARY. During the years 1910—1921 553 cases of tuberculous glands have been treated at the Finsen Institute partly by X rays, partly by light.

The results show what light in the form of chemical artificial light baths (*the carbon arc-light is much superior to the Mercury vapour light*) is much better than X rays, for 98 per cent or about all patients treated with light baths, were completely cured, while Roentgen gave only 40 per cent of cures.

It is shown what a dangerous effect X ray treatment can have on the skin, the X rays can produce Atrophy and Teleangiectasia of the skin in doses which are generally recommended and employed and in using the stronger doses Roentgen ulcers that are most difficult to heal, may arise.

Light on the contrary has no harmful effect, but a highly beneficial influence on the whole organism. Patients become well and healthy, gaining in weight etc.

The writer emphasizes that the modern treatment of tuberculous glands is a combination of all known methods; Light operation and Roentgen rays, the latter, however, in such small doses that all risk of causing harm to patients is excluded.

It is advisable that seaside hospitals should be built for this type of patients, for there the sun and fresh, crisp air could be utilized. Another point of great importance is that persons suspected of tuberculosis should be sent to the country during the summer months to get there sea and sunbaths, while in winter artificial light baths, especially with carbon arc-light, should be used. Children suffering from tuberculous glands should be sent to seaside sanatoriums, which are fitted up with artificial light baths.

ZUSAMMENFASSUNG. Während der Jahre 1920—1921, wurden am Finsen-Institute 553 Fälle von tuberkulösen Dürsen behandelt, teils mit Röntgenstrahlen, teils mit Licht.

Die Resultate zeigen, dass Licht in der Form chemischer artifizieller Lichtbäder (*Kohlenbogenlicht ist dem Quecksilberdampflicht bedeutend überlegen*) viel wirksamer ist als Röntgenstrahlen, denn 98 % oder fast alle mit Lichtbädern behandelten Patienten wurden vollständig geheilt, während Röntgenstrahlen nur bei ungefähr 40 % Heilung herbeiführten.

Es wird gezeigt, welch gefährliche Wirkung Behandlung mit Röntgenstrahlen auf die Haut haben kann; sie können in Dosen, die allgemein empfohlen und angewendet werden, Atrophie und Teleangiektasie der Haut hervorrufen und bei Gebrauch stärkerer Dosen können äusserst schwer heilbare Röntgengeschwüre entstehen.

Licht dagegen hat keinen schädlichen Effekt, sondern einen höchst wohltätigen Einfluss auf den ganzen Organismus: die Patienten werden wieder frisch und gesund, nehmen an Gewicht zu etc.

Verf. betont, dass die moderne Behandlung tuberkulöser Drüsen alle bekannten Methoden kombinieren muss; Licht, Operation und Röntgenstrahlen, die letzteren allerdings in so kleinen Dosen, dass jedes Risiko einer Schädigung der Patienten ganz ausgeschlossen ist.

Ferner wird hervorgehoben, dass für diese Gattung von Patienten Küstensanatorien gebaut werden sollten, denn da könnte Sonne und frische reine Luft ausgenützt werden. Ein anderer Punkt von grosser Bedeutung ist, dass tuberkuloseverdächtige Individuen während der Sommermonate aufs Land geschickt werden sollten, um See- und Luftbäder zu nehmen, während sie im Winter künstliche Lichtbäder, besonders mit Kohlenbogenlicht, erhalten sollten. Kinder, die an tuberkulösen Drüsen litten, wären in Küstensanatorien zu schicken, welche mit künstlichen Lichtbädern ausgestattet sind.

RÉSUMÉ. Pendant les années 1910—1923 553 cas de ganglions tuberculeux ont été traités à l'Institut Finsen, d'une part avec des Rayons X, d'autre part avec de la lumière.

Les résultats démontrent que la lumière en forme de bains de lumière chimique artificielle (*la lumière à l'arc de charbon est de beaucoup supérieure à la lumière à vapeur mercurielle*) est bien meilleure que les Rayons X, car 98 p. cent de tous les malades traités par les bains de lumière ont été complètement guéris, tandis que les Rayons X ne donnaient que 40 p. cent de guérisons.

Il est démontré quel effet nocif les Rayons X peuvent avoir sur la peau, ils peuvent produire l'atrophie et la téléangiectasie de la peau avec des doses qui sont généralement recommandées et employées et en appliquant des doses plus fortes des ulcères radiologiques peuvent se présenter qui sont très difficiles à guérir.

La lumière par contre n'a pas d'effet nocif, mais exerce une influence très bienfaisante sur tout l'organisme, les malades reprennent des forces, augmentent de poids, etc.

L'auteur souligne que le traitement moderne des ganglions tuberculeux doit être une combinaison de toutes les méthodes connues, lumière, opérations, rayons X, ces derniers cependant dans des doses si petites que tout risque de faire du mal au malade est exclu.

L'auteur fait remarquer qu'il serait utile de construire des hôpitaux sur la côte pour ce genre de malades, où le soleil et le grand air offriraient des moyens thérapeutiques importants. D'autre part, il est très important que les personnes suspectes de tuberculose soient envoyées à la campagne pour faire une cure de soleil et de bains de mer, tandisqu'en hiver il faudrait employer des bains de lumière artificielle, surtout à l'arc de charbon. Les enfants qui souffrent de ganglions tuberculeux doivent être envoyés à des sanatoriums qui sont munis de bains de lumière artificielle.

RESUMEN. Durante los años 1910—1923 fueron tratados 553 casos de ganglios tuberculosos en el Instituto Finsen, en parte con los Rayos X y en parte con luz.

Los resultados demuestran que la luz en forma de baños de luz química artificial (*la luz de un arco de carbones es en mucho superior a la luz de vapores mercuriales*) es mucho mejor que los Rayos X, puesto que el 98 % de todos los enfermos tratados con baños de luz quedaron completamente curados, al mismo tiempo que los Rayos X no dieron más que un 40 % de curas.

Ha sido demostrado el efecto nocivo de los Rayos X sobre la piel. pudiendo producir la atrofia y la teleangiectasis de la piel, cuando se emplean dosis, que por lo general se recomiendan y emplean, pero aplicando dosis más fuertes pueden presentarse úlceras radiológicas, que resultan de muy dificil curación.

La luz, por el contrario, no tiene el menor efecto perjudicial, sino que ejerce una influencia bienhechora sobre todo el organismo, los enfermos recuperan sus fuerzas, aumentan de peso, etc, etc.

El autor subraya a que el tratamiento moderno de los ganglios tuberculosos debe ser una combinación de todos los métodos conocidos, luz, operaciones, Rayos X, éstos últimos, sin embargo, en dosis tan reducidas para que todo riesgo de ocasionar molestias al en fermo quede excluído.

El autor hace notar que sería útil la construcción de hospitales, en la costa, para esta clase de enfermos, en donde el sol y el aire libre ofrecen medios terapéuticos de importancia. Por otra parte, es de un gran valor que las personas sospechosas de tuberculosis sean enviadas al campo para seguir una cura de sol y de baños de mar, mientras que en invierno deberían emplearse los baños de luz artificial, sobre todo de arco de carbón. Los niños que padecen ganglios tucerculosos deben enviarse a los sanatorios provistos de baños de luz artificial.

FROM THE ROENTGEN DEPT. OF THE SERAPHIMER HOSPITAL, STOCKHOLM
CHIEF: PROFESSOR G. FORSSELL

EXPERIENCES OF THE FINAL RESULTS IN ROENTGEN TREATMENT OF TUBERCULOUS LYMPHOMATA

by

Gösta Runström

The roentgen treatment of tuberculous glands which has steadily become more universally employed during the last ten years, has undoubtedly been a valuable aid in the treatment of this disease. From different quarters reports have been published of the results obtained which seem generally good. In some reports, however, there are comparatively numerous cases of secondary skin changes. There is some difficulty in comparing the results, since the technique and the material vary considerably. Many interesting and important problems remain to be solved, before this method of treatment will attain the safeness to be desired. Thus, an enlarged knowledge has to be gained as to suitable doses as well as to the planning and limitation of the treatment.

Secondary skin changes must be excluded or reduced to a minimum. This latter is of especial importance, as one of the indications of the roentgen therapy is its better cosmetic results as compared to those obtained by the surgical treatment. The publication of the experiences of still another material should therefore be a contribution of some value. At the request of Professor FORSSELL I have therefore made an after-examination with regard to the results of healing and the occurrence of eventual skin changes in the cases of tuberculous glands treated under his direction at the Roentgen Dept. of the Seraphimer Hospital in the period 1911—1921. The statistics include 145 cases that could be traced at the after-examination. About half the number of these patients have turned up in person for the after-examination. The others have communicated information about their condition by answering a detailed inquiry blank that was sent them.

Naturally, the technique of treatment employed has varied during such a long space of time, owing to the development of the roentgen technique. Prior to 1912, a filter of 1—2 leaves of tinfoil

was used, and then, until 1918, 1 millimeter of aluminium and a parallel spark gap of from 10 to 15 centimeters, and a skin-focus distance of 20 centimeters. The glands were irradiated through several separate fields, a dose of about 2.5 H, according to the terminology of SABOURAUD, being delivered through each field. An interval of from 2 to 3 weeks was interposed between each series. After 1918, a filter of 3—4 millimeters of aluminium was employed, with a parallel spark gap of from 20 to 25 centimeters and a skin-focus distance of 20—23 centimeters. A dose of 5 H was delivered through each field of entry and an interval of 3—4 weeks was allowed between each series. The principle maintained by Professor FORSSELL that the dose should not amount to a full erythema dose has been generally adhered to, and the dose through each portal has largely corresponded to 1/3 H. E. D., as designated by the Erlanger school. In 1920, under another direction, a different technique was employed, doses as strong as full erythema doses being delivered. Broken down glands have been punctured or incised, and in cases of chronic fistulae the caseous and calcareous matter has been scraped out with a ladle. Injection of iodoform glycerine have been given in some few cases. The larynx and the thyroid and thymus glands, as well as other extra-glandular regions, have been carefully protected by means of 4 millimeters of lead-rubber. The patients have, with few exceptions, been treated in the out-patient department and belonged to the poor classes.

In estimating the results I have, in the same manner as EDLING (Acta radiologica Vol. I. p. 455), divided the 145 cases into three groups with regard to the condition of the glands at the commencement of the treatment:

Group I, 18 cases: Simple glandular hyperplasia.

Group II, 41 cases: Glandular hyperplasia with periadenitis.

Group III, 86 cases: Broken down glands and eventual fistulae.

With regard to the results of the treatment the cases have been divided into four groups:

a) Symptomless cases showing a complete disappearance of the glands and being subjectively as well as objectively healthy. — 53 cases, or 36,7 per cent. Of those 8 cases belong to group I, 13 cases to group II and 32 cases to group III.

b) Cases with persistent, indolent, glandular remains, i. e. small palpable remains which have been unchanged for such a long time that the morbid process may be considered at an end — 77 cases, or 53,1 per cent. Of those 10 cases belong to group I, 25 cases to group II and 42 cases to group III.

c) Cases that have had a recurrence and become healed after

repeated treatment — 14 cases, or 9,5 per cent. Of those no ones belong to group I, 3 cases to group II and 11 cases to group III.

d) Cases not healed — 1 case that belongs to group III (persistent glandular remains and fistula).

Group *a* is very likely too large since the information in half the number of cases has been supplied by the patients themselves who have probably overlooked some glandular remains. Nearly all recurrences belong to group III.

The duration of the healing after the last treatment has been 2—3 years in 40 per cent, 3—5 years in 30 per cent, and 5—10 years in 30 per cent of the cases.

In 25 cases, or 17 per cent of the total material, skin changes have occurred, namely, slight atrophy with slightly dry, thin skin in 18 cases, and marked atrophy with thin, pale, dry skin and teleangiectasis in 7 cases.

In no cases have there been any serious skin changes with ulcerations and necroses. No lesions of adjacent organs, such as myxoedema and laryngitis, have been observed.

If we look at the frequency with which the skin changes have occurred, considering the length of the time of treatment, i. e. the time elapsed between the first and last irradiation it becomes quite evident that the number of skin lesions increases with the time of treatment, and this is, of course, only to be expected. In the cases of the entire material, in which the time of treatment has been half a year, skin changes are met with in 5 per cent, 1 year 14 per cent, 3 years 30 per cent and more than 3 years 32 per cent. All of these latter cases are recurrences.

Within the three main groups the frequency of occurrence of skin changes, calculated for all cases belonging to each separate group, is as follows: Group I, 5 per cent (1 case with slight atrophy); Group II, 9 per cent; and Group III, 28 per cent.

With regard to the age of the patients, it is quite plain that the number of skin changes increases with the age. Thus, in the Groups I and II no such changes are met with in patients under 21 years of age, and in Group III most of these changes are found after 15.

Of the 25 cases that have exhibited permanent skin changes, 18 have had erythema once or several times during the course of treatment. Besides, fistulae, persistent secretion, and scrofuloderma have been present in 18 of these cases. In 1920, 5 of these 25 cases have been treated with a different technique, as much as full erythema doses having been delivered through each field of entry.

In 120 cases, or 83 per cent, there are no appreciable skin changes. $^2/_3$ of those were healed in 1 year and most of the others in 3

years. Of those who have been treated in longer time nearly all are recurrences. With regard to the 3 main groups, in group I all are healed in 1 year, and in groups II and III more than 50 per cent are healed in 1 year. With regard to the age of the patients there is no difference in the time of healing.

From what has been said it will be seen that as to healing the result must be considered good, but that cases of secondary skin changes are present, though they are neither numerous nor of a serious nature.

From the after-examination it is seen further that the chief cause of these skin changes appears to be the production of an inflammatory skin reaction during the course of treatment. This is produced either by too strong doses, as in the above-mentioned cases treated with a different technique in 1920, or by doses frequently repeated at too short intervals, although these doses do not in themselves produce any reaction.

In several of these cases reaction has appeared after 6 à 8 series given at intervals of 3 à 4 weeks and with a dosage of 1/3 H. E. D. filtered through 3—4 millimeters of aluminium. It is also seen quite plainly that the risk of erythema and subsequent atrophy of the skin is further increased in cases of fistulae, persistent secretion, and scrofuloderma. This extraneous, irritative moment is here superadded to the effect of the roentgen rays and produces a stronger reaction than is otherwise the case.

It is further seen that in renewed treatments of recurrences within a previously treated area the risk of skin reaction increases more and more, even if doses that are far weaker than the erythema dose (1/3 à 1/4 H. E. D.) are delivered at intervals of 3 à 4 weeks.

The skin dose employed by us — 1/3 à 1/4 H. E. D. — seems appropriate, on the whole. On the basis of the experiences we have gained, our technique of the past few years has been highly individualized. The dose through each field has been 1/5 à 1/3 H.E.D., the spark gap 39 centimeters, skin-focus distance 30 centimeters, and a filter of 4 millimeters of aluminium or 0.5 millimeters of copper plus 1 millimeter of aluminium.

In cases belonging to Group I and Group II, when large glands are present, it is generally sufficient to employ a filter of 4 millimeters of aluminium. Following the first irradiation a new series can be given in 2 à 3 weeks and then the intervals may be progressively increased to 3 à 6 weeks. In this manner as much as 6 or 8 series, at the most, can be given without any risk to the skin. However, the condition of the skin and the manner of reac-

tion of the glands must then be carefully observed all the while, and it is not desirable to extend the treatment to more than 6 series nor to exceed a total time of treatment of one year.

In cases of large glands, belonging to Group II and in cases belonging to Group III, having a tendency to persistent fistulae with secretion, or on the whole when there is reason to expect that the treatment will take a long time, a filter of 0.5 millimeters of copper plus 1 millimeter of aluminium may be prefered. The dose is generally $^1/_5$—$^1/_3$ H. E. D. through each field of entry, or, in the event of large glands, these may be irradiated through several fields, $^1/_5$—$^1/_4$ H. E. D. The treatment is planned as in the irradiation delivered through a filter of 4 millimeters of aluminium. A filter of 0.5 millimeters of copper or zink is resorted to also in cases which from the very first have proved so refractory to some previous technique that the treatment seems to become procrastinated, and also in renewed treatment of recurrences.

If possible, children should be treated by the aluminium technique in order to avoid lesions of the adjacent organs. The risk of causing skin changes is, as we found, less in these cases.

It is especially important to stop the treatment or to interpose longer intervals between the series when the glands, having become considerably reduced after the first series of irradiations, do not then be reduced at all, or only slowly, after the next irradiation. Frequently there are then only some fibrous remains which do not give any reason of irradiation. It is then sufficient to keep the patient under observation and to interfere only as reason arises. In this manner the time of treatment as well as the risk to the skin are reduced.

When there is a tendency to persistent fistulae which is generally sustained by caseated or calcified debris, these should be scraped out. If a central breaking down has already commenced it should be hastened by irradiation and then the abscess may be evacuated through an incision. This should not be performed until as much of the gland as possible has broken down, though not until the skin has become discoloured. In this way a rapid healing is often secured at once.

By employing this individualized technique we have reduced the time of treatment considerably and have not yet been able to find any changes in the skin. The general condition of the patients has not been affected. No blood examinations have been made, but there can hardly be any blood changes worth mentioning when such small doses as those that we are here dealing with, are employed.

The knowledge we have acquired from our cases may be briefly

summarized in this way that the tuberculous lymphomata do generally not require large single doses to heal, that the treatment must be highly individualized, and that lesions of the skin are avoided by limiting the number of the exposures and the time of treatment.

SUMMARY

The author has made an analysis of 145 cases of tuberculous lymphomata treated polyclinically by the roentgen therapy at the Roentgen Department of the Seraphimer Hospital, Stockholm, from 1911 to 1921 incl.

The material comprises 18 cases of simple glandular hyperplasia, 41 cases of glandular hyperplasia with periadenitis, 86 cases of broken down glands and eventual fistulae.

Of the entire material 40 per cent are healed and are free from symptoms, 50 per cent have some small, indolent glandular remains, 9.5 per cent are completely healed after recurrence. Only one case shows a persistent fistula.

Skin changes have occurred in 25 cases (17 per cent) out of the whole material, namely, in 18 cases dry, thin skin, in 7 cases atrophy with teleangiectasis. Neither necroses, ulcerations, nor organic lesions have been observed. Skin changes have been most common in cases with fistulae.

Contributive causes to the skin changes are: Too large doses, exposures repeated frequently during a long period, this also in the event of small doses, renewed treatment of recurrences within previously treated areas, skin irritation owing to persistent secretion from fistulae.

On the basis of the experience gained the author advises a highly individualized technique: 4—6 series of single doses of from 1/5 to 1/3 H. E. D., spark gap 39 centimeters, skin-focus distance 30 centimeters, filter 4 millimeters of aluminium or 0.5 millimeters of copper or zink, depending upon the extension and condition of the glands.

Lesions of the skin can be avoided by limiting the doses and the time of treatment.

ZUSAMMENFASSUNG

Der Verf. hat ein Material von 145 Fällen tuberkulöser Lymphome analysiert, die an der Röntgenabteilung des Seraphimerkrankenhauses in Stockholm 1911 bis Ende 1921 poliklinisch röntgenbehandelt worden waren.

Das Material bestand aus 18 Fällen einfacher Drüsenhyperplasie, 41 Fällen von Drüsenhyperplasie mit Periadenitis, 86 Fällen mit Zerfall von Drüsengewebe und eventuell Fisteln.

Vom ganzen Material sind 40 % geheilt und symptomfrei, 50 % haben kleine, indolente Drüsenreste, 9,5 % sind nach einem Rezidiv vollkommen geheilt. Nur ein Fall zeigt eine persistierende Fistel.

Hautveränderungen traten in 25 Fällen (17 %) des ganzen Materials ein, nämlich in 18 Fällen trockene, dünne Haut, in 7 Fällen Atrophie mit Teleangiektasie. Weder Nekrosen, Ulzerationen, noch organische Läsionen kamen

zur Beobachtung. Am häufigsten waren die Hautveränderungen bei Fällen mit Fisteln.

Beitragende Ursachen zu Hautveränderungen sind: Zu grosse Dosen, durch lange Zeit häufig wiederholte Expositionen, dies also auch bei kleinen Dosen, neuerliche Behandlung von Rezidiven auf vorher behandelten Feldern, Hautirritation infolge persistierender Sektion von Fisteln.

Auf Grund der gewonnenen Erfahrung empfiehlt Verf. eine sehr individualisierte Technik: 4—6 Serien mit Einzeldosen von $^1/_5$ bis $^1/_3$ H. E. D., Funken-distanz 39 cm, Haut-Fokus-Distanz 30 cm, Filter 4 mm Aluminium oder 0,5 mm Kupfer oder Zink, je nach der Grösse und dem Zustand der Drüsen.

Hautläsionen können durch Beschränkung der Dosen und der Behandlungszeit vermieden werden.

RÉSUMÉ

L'auteur a examiné 145 cas de lymphôme tuberculeux, qui sans être hospitalisés avaient été traités aux Rayons X dans le service radiologique de l'Hôpital des Séraphins à Stockholm, de 1911 à 1921 inclusivement.

Parmi ces 145 cas il y a 18 cas d'hyperplasie ganglionnaire simple, 41 cas d'hyperplasie ganglionnaire avec périadénite, 86 cas de ganglions ramollis et éventuellement des fistules.

40 p. cent de tous les cas sont guéris et exempts de symptômes, 50 p. cent ont de petits reliquats ganglionnaires indolores, 9,5 p. cent sont complètement guéris après récidive. Un cas seulement présente une fistule persistante.

On a trouvé des *altérations de la peau* dans 25 cas (17 p. cent), dont 18 cas avaient la peau sèche et mince, et dans 7 cas de l'atrophie avec téléangiectasie. Ni nécroses, ni ulcération, ni lésions organiques n'ont été observées. Les altérations de la peau ont le plus souvent été observées dans les cas avec fistules.

Les facteurs favorisant les altérations dermiques sont: de trop grandes doses, des irradiations fréquemment répétées pendant une longue période, ceci également dans le cas où de petites doses avaient été données, traitement renouvelé de récidives dans des régions précédemment irradiées, irritation dermique due à la sécrétion continue des fistules.

En se basant sur les résultats ainsi gagnés l'auteur recommande une technique très individualisée: 4 à 6 séries de doses simples de $^1/_5$ à $^1/_3$ H. E. D., étincelle de 39 cm., distance de la peau au foyer 30 cm., philtre d'aluminium de 4 mm. ou 0,5 mm. de cuivre ou de zinc, selon le volume et l'état des ganglions.

Les lésions dermiques peuvent être évitées en limitant les doses et la durée du traitement.

RESUMEN

El autor ha examinado 145 casos de linfomas tuberculosos que sin haber sido hospitalizados fueron tratados por los Rayos X en el servicio radiológico del Hospital Serafimer en Estocolmo, desde 1911 a 1921 ambos inclusive.

Entre estos 145 casos 18 casos fueron de hiperplasia ganglionar simple, 45 casos de hiperplasia ganglionar con periadenitis, 86 casos de ganglios reblandecidos y eventualmente con fístulas.

El 40 % de todos los casos estaban curados y exentos de síntomas, 50 % presentaban pequeñas reliquias ganglionares sin dolor, 9,5 % quedaron completamente curados desoués de reincidencia. Tan sólo un caso presenta una fístula persistente.

Se han hallado *alteraciones de la piel* en 25 casos (17 %), de los cuales 18 tenían la piel seca y delgada y en 7 casos una atrofia con teleangiectasia. No fueron observadas ni necrosis, ni ulceraciones, ni lesiones orgánicas. Las alteraciones de la piel fueron generalmente observadas en los casos que presentaban fístulas.

Los factores que favorecen las alteraciones dérmicas son: el exceso de dosis fuertes, las irradiaciones repetidas con frecuencia durante un largo período, esto incluso en los casos en que se aplicaron pequeñas dosis en un tratamiento renovado en caso de reincidencias en las regiones irradiadas anteriormente, irritación dérmica debida a la secreción continua de las fístulas.

Basándose en los resultados así obtenidos, el autor recomienda una técnica completamente individualizada: 4 a 6 series de dosis simples de ($^1/_5$ a $^1/_3$ H. E. D. chispa de 39 cm., distancia de la piel al foco 30 cm., filtro de aluminio de 4 mm. o de 0,5 mm. de cobre o de zinc según el volumen y el estado de los ganglios.

Las lesiones dérmicas pueden ser evitadas limitando las dosis y la duración del tratamiento.

COMMUNICATION FROM THE FINSEN INSTITUTE, COPENHAGEN. THE DEPARTMENT FOR DISEASES OF THE SKIN: CHIEF. A. REYN, M. D., AND THE LABORATORY: CHIEF: C. SONNE, M. D.

SOME FURTHER INVESTIGATIONS INTO THE OPTICAL CHARACTERS OF THE LUPUS NODULES AND THE BEARING OF THESE CHARACTERS ON THE FINSEN TREATMENT

by

H. Haxthausen, M. D.

In a former paper [1]) we have shown that the so-called »visible heat rays» probably play a rôle in the FINSEN light treatment of lupus vulgaris by the fact that their absorption in the skin causes the temperature of the area under treatment to rise to about 50° C. or even higher. Moreover, it was noticed that the lupous tissue as a rule became several degrees warmer than the normal skin, and there was ascertained, about the lupous tissue, an optical peculiarity which furnished a natural explanation of this interesting fact. It was found that the peculiar »candy-sugar» tint — usually spoken of as the »colour» of the lupus nodules — which appears when a glass spatula is pressed against the skin, was not a colour, in the true sense of that word, but was simply due to a greater transparency of the lupous tissue. And, furthermore, it was found that all the rays of the visible spectrum, all the way from red to violet, passed through the lupous tissue more easily than through the normal skin; a circumstance which was explained as being due to the fact that the diffusion of the light was less in the more homogeneous lupous tissue than in the normal skin with its well preserved fibrillary structure. It was pointed out that this difference in the diffusion of the light must have a bearing not only on the action of the visible heat rays, but also on that of the chemically active rays, and probably in an even higher degree as re-

[1]) Strahlentherapie, 1921, 13, p. 654.

gards the latter, because, as we know, the diffusion of the light becomes greater the more refrangible the rays are, by which that light is produced. As a proof of this it was demonstrated, for instance, that the action of the light on a piece of silver chloride paper was considerably stronger when that action took place through an interposed section of lupous tissue than through a section of normal skin of the same thickness. As regards the visible heat rays, a quantitative expression for the difference between the lupous tissue and the normal skin was obtained by means of a series of thermo-electric measurements which, as already mentioned, showed the rise in temperature to be higher for the lupous tissue. In this paper it is proposed to complete the results thus obtained with some quantitative investigations also of the chemically active rays, in connection with which a still greater difference would, as already stated, a priori be expected between the lupous tissue and the normal skin.

The following method of procedure was employed:

A lupous patch, together with an ample portion of the surrounding, healthy skin was excised, and the subcutaneous tissue carefully dissected away. The specimen thus obtained was then placed between two planoparallel quartz plates which by means of a special device could be pressed together in such a manner that the section of skin became expanded to its original extent, while, at the same time, the thickness of the layer, as read by a graduated screw, was uniform all over. The specimens were selected in a manner so as to consist of about one half lupous tissue and the other half normal skin.

The difference in transparency, between the lupous tissue and the normal skin, was now examined into by means of a spectrograph with quartz lenses, on the aperture of which the light from a mercury quartz lamp [»Højfjældsol»] was focussed after being concentrated through a large converging lens of quartz. The specimens were placed immediately in front of the aperture in such a manner that both a part of the lupous tissue and a part of the normal skin came within the field of illumination, and it was then ascertained, by means of photography, which ones of the characteristic lines of the mercury spectrum passed through under various conditions of experimentation, and whether there was a difference in the intensity of penetration through lupous tissue and through normal skin.

It proved to be a matter of considerable difficulty to obtain specimens in which the lupous tissue had a sufficiently uniform extension over an area large enough to permit of this spectrographic in-

vestigation being made. Of all the lupus patches excised during a considerable period only 6 were found suitable for the purpose. In most cases the nodules were too small and scattered, or there were complications of cicatrices or ulcerations.

In order to facilitate the survey of the tests, the principal lines of the mercury lamp spectrum are given herewith. They are:

579, 546, 436, 405 $\mu\mu$ in the visible spectrum; 366, 339, 313, 302, 298 $\mu\mu$ in ultraviolet. There are still other lines farther out in the ultraviolet, but they play no rôle as far as the present investigations are concerned, inasmuch as none of them passed through any of the specimens with which the tests were made.

Already by the simple procedure described above, there was ascertained a considerably stronger transparency of the lupous tissue to the chemically active rays, and especially to those of the ultraviolet field.

The first specimen examined was one that had been taken from a case of lupus in the elbow presenting a diffuse and very transparent infiltration. Thickness: 1.45 mm. The results obtained were as follows:

Duration of exposure, 1 minute: The normal skin allowed the following lines to pass through: 579, 546, 436, 405, 366. The lupus showed a distinct reinforcement of the lines 436, 405 and 366; and 339 as well as 313 also passed through.

Exposure, 2 minutes: Same result.

Exposure, 4 minutes: Same result, with the exception that traces of line 339 now passed through the normal skin, and traces of line 302 through the lupus.

The same test was then repeated with a specimen taken from a case of lupus in the neck; the nodules, in this case, being only slightly transparent, and partly imbedded in cicatricial tissue. Thickness: 1.90 mm.

Duration of exposure, 1 minute: The normal skin allowed all the lines up to and including 366 $\mu\mu$, to pass through, and there were traces of 339. The lupus showed distinct reinforcement of 436, 405 and 366, besides which 339 was plainly visible, and 313 could just barely be distinguished. *Exposure, 2 minutes:* Similar result, only that 339 and 313 were now distinctly visible through the normal skin. Through the lupous tissue the lines 436, 405 and 366 were intensified in the same degree as before, while 339 and 313 had become considerably more marked.

Exposure, 4 minutes: Similar result. Through the lupous tissue all the lines from 436 to 313 incl. intensified, and now also trace of 302.

The result of these preliminary investigations seemed to indicate that the difference in transparency, between the normal skin and the lupous tissue, became increasingly marked toward the farther end of the ultraviolet field of the spectrum, as would also quite naturally be expected when this transparency was due to a difference in the diffusion of the light. And inasmuch as, moreover, the spectrograms obtained let suppose that the question was one of quite considerable differences it was immediately evident that a more exact quantitative determination of them would be of great interest, considering the importance of their bearing on the Finsen treatment.

It is a matter of considerable difficulty, however, to obtain such a numerical expression for the different transparency of the normal skin and the lupous tissue to the chemically active light. It lies near to think that the problem might be solved by comparing the different degrees to which a series of photographic plates were darkened when exposed to the light for various lengths of time through lupous tissue and normal skin, respectively. But this method would not give the desired result for the reason that the degree of darkening is not proportional to the duration of the exposure. The last named factor must be constant throughout all the comparative tests, while *the intensity* of the light is the one that should be varied. Now, it is a matter of very great difficulty to reduce the intensity of the light uniformly through the entire range of the spectrum, but it seems to me that a satisfactory solution of this problem has been achieved by Dr. P. SCHULTZER, in the contrivance invented by him and which has been used in the investigations about to be described. I desire to express my thanks to Dr. SCHULTZER not only for the permission to use this invention of his, but also for his excellent help in carrying out the experiments.

The contrivance, which consists in two thin, semicircular tin discs that can be slid toward one another, is attached immediately onto the plane surface of the large planoconvex lens that serves to focus the light from the mercury lamp on the aperture of the spectrograph. A series of graduated marks allows of the discs being adjusted and the surface of the lens being uncovered in larger or smaller sectors, from 0° to 180°. Inasmuch as the central and peripheral portions of the lens are thus eliminated in a uniform manner, the quantity of light emanating from the lens no doubt becomes proportional to the width of the sector, that is: to the number of degrees, while the intensity of the various rays is, of course, reduced in exactly the same proportion. The unavoidable shortcomings attaching to this procedure — and notably the fact that the picture

forming in the aperture varies slightly with the different width of the sector — are surely so small that, with a proper setting of the apparatus, we may count them as negligible where the question is one of such rather rough quantitative determinations as the ones here attempted.

In performing the experiments, the following technique was employed:

. With an exposure of 2 minutes for each, 2 spectrograms were taken: first one through the normal skin, and afterwards one through the lupous tissue, in both cases using $^1/_2$ of the surface of the lens (sector, 180°). Following this, a series of spectrograms were made through the lupous tissue, on one and the same plate, and each time with an exposure of 2 minutes, but with a 30° narrowing of the sector for each consecutive exposure. By this procedure the intensity of the light was reduced, first to $^5/_6$, subsequently to $^4/_6$, $^3/_6$, $^2/_6$, and finally to $^1/_6$ (corresponding, respectively, to sectors of 150°, 120°, 90°, 60°, and 30°). The plate was then developed, and those spectra were looked for, in which some line or other presented precisely the same degree of intensity as when photographed through the normal tissue. At those two points the same effect would consequently have been produced in the same space of time, and consequently the same quantity of light must have passed through the two tissues. But if, in the case of the lupous tissue, this result had been obtained with an intensity of light only $^3/_6$ as great as the intensity to which the normal skin had been exposed, then it could be deduced that the lupous tissue, in that thickness, had reduced the penetrant power of the light only about half as much as the healthy skin of the same thickness; or, in other words: a lupous layer of that thickness allows twice as much light of that wavewidth to pass through, as the healthy layer of the same thickness.

Altogether 4 specimens were examined in this manner, with the results given below. Where a certain darkening of some particular line, through the lupous tissue, has been obtained with, for instance, $^4/_6$ of the quantity of light necessary for obtaining the same degree of darkening through the normal skin, this proportionality is expressed by stating the transparency of the lupous tissue as $^6/_4$. The figure >1 indicates that, with equal quantities of light, the line was more distinctly marked through normal skin than through lupous tissue.

It will be observed that these results in a great measure confirm the hypothesis as to the existence of a considerable difference in transparency, between the lupous tissue and the normal skin. In

Ratio of transparency of the lupous tissue, to that of the normal skin:

Specimen:	I	II	III	IV
Thickness:	2.4 mm.	2.1 mm.	2.3 mm.	1.9 mm.
Width of wave: 579 $\mu\mu$	$^6/_5$	$^6/_3$	$^6/_2$	$^6/_4$
546 »	$^6/_5$	$^6/_3$	$^6/_2$	$^6/_5$
436 »	$^6/_4$	$^6/_2$	$^6/_2$	$^6/_5$
405 »	$^6/_3$	$^6/_1$	$^6/_1$	$^6/_4$
366 »	$^6/_3$	$^6/_1$	$^6/_2$	$^6/_3$
339 »	<1	$>^6/_1$	not seen	only visible through lupus
313 »	<1	not seen	» »	» »

a general way the difference increases the farther we come out into the ultraviolet field, and in those parts of the spectrum that play the greatest rôle as regards the FINSEN treatment — in which connection the inner ultraviolet rays are the ones usually counted with — it will be seen that the differences become as large as from 100 to 600 per cent . . The reduced transparency to the farthest ultraviolet rays which is noticed in specimen no. I, may be due to the presence in the lupous tissue of a trifling quantity of some absorbent substance, for instance to a slight bleeding. On the other hand the variations are no greater than might be expected in view of the somewhat difficult technique, and the figures obtained are in perfectly good agreement with the hypothesis of the lesser diffusion through the lupous tissue being the determining factor. As might be expected, there were differences between the various nodules, some being more and others less transparent. There were also some rather marked differences between the several specimens taken in their entirety; thus no. I, for instance, although thicker than no. IV, evidently allowed a somewhat greater quantity of short-wave light to pass through than did the latter; but this may have its very natural explanation in a different pigmentation of the epidermis, or some similar circumstance.

I venture to believe that the results obtained are of considerable importance for our entire conception of the action produced by the FINSEN treatment. It is generally acknowledged that in this treatment it is the chemically active rays that play the principal part; and whichever more narrowly delimited section within this part of the spectrum one may be inclined to point to as the place of the rays primarily responsible for this action, the fact remains that this action is markedly different on the lupous tissue and the normal

skin. Owing to conditions of a *purely optic nature* we have to do with a distinctly elective action of the chemically active rays on the lupous tissue, the greater transparency of the latter causing not only a deeper penetration of the rays, but also a greater intensity of action throughout the greater part of the illuminated area. This can be best illustrated by taking a concrete example: Let us suppose that the normal skin, in a thickness of 1/100 mm., absorbs one half of a light of a certain wave-length, and that the lupous tissue, being more transparent, in the same thickness absorbs, for instance, one fourth. In the upper 1/100 mm. layer there is absorbed, then:

in the normal skin $^1/_2$; in the lupous tissue $^1/_4$. In the next layer of 1/100 mm. the absorption is: in the normal skin $^1/_2 \times {}^1/_2 = {}^1/_4$, in the lupous tissue $^3/_4 \times {}^1/_4 = {}^3/_{16}$; in the third layer: normal skin $^1/_4 \times {}^1/_2 = {}^1/_8$, lupous tissue $^9/_{16} \times {}^1/_4 = {}^9/_{64}$. Thus, the absorption is already greater in the lupous tissue; and the deeper the penetration, the higher will the ratio become. This may also be expressed by saying that, in the lupous tissue, the feeble amount of absorption near the surface leaves more light for absorption deeper down. But inasmuch as the action on the tissue increases with the quantity of light absorbed, this action undoubtedly becomes strongest in the case of the lupous tissue, with exception only of the layers nearest the surface. The action of the chemically active rays on the lupous tissue thus becomes highly elective both in regard to depth and intensity; and the fact that also the visible heat rays, as we have previously shown, are to a certain extent elective in their action of heating the tissue, helps still further to explain why the local, phototherapeutic treatment has proved so particularly effective precisely in the case of lupus vulgaris.

SUMMARY

The greater transparency, demonstrated in a preceeding paper, of the lupous tissue as compared with that of the normal skin, has been investigated quantitatively, with special regard to the chemically active rays.

With a thickness of tissue as used in the tests — about 2 mm. — it was found that the rays playing the greatest rôle in the FINSEN treatment penetrated the lupous tissue in quantities from double to six times as great as the quantity that passed through normal skin of the same thickness.

This circumstance furnishes a natural explanation of the particular efficacy of local, phototherapeutic treatment in the case of lupus vulgaris; the action, from mere optical causes, becoming markedly elective toward the diseased tissue, where the operation of the light becomes both stronger and, particularly, more deep-going.

ZUSAMMENFASSUNG

Die in einem früheren Artikel erwiesene grössere Transparenz des Lupusgewebes im Vergleich zu demjenigen normaler Haut wurde quantitativ untersucht, mit besonderer Berücksichtigung der chemisch wirksamen Strahlen.

Bei einer Dicke des Gewebes, wie sie für die Proben verwendet wurde — ungefähr 2 mm — fand man, dass die Strahlen, welche bei der FINSEN-behandlung die grösste Rolle spielen, das Lupusgewebe in doppelt bis sechsmal so grosser Quantität durchdrangen, als sie normale Haut derselben Dicke durchsetzen.

Dieser Umstand liefert eine natürliche Erklärung für die besondere Wirksamkeit lokaler phototherapeutischer Behandlung im Falle von Lupus vulgaris, indem die Wirkung aus rein optischen Ursachen eine ausgesprochen elektive wird gegenüber dem erkrankten Gewebe, bei dem die Leistung des Lichtes nicht nur kräftiger, sondern insbesondere auch tiefer gehend wird.

RÉSUMÉ

La plus grande transparence dont il a été parlé dans un article précédent, du tissu lupeux comparée avec celle de la peau normale, a été examinée quantitativement, surtout au point de vue des rayons chimiques.

On a trouvé alors qu'avec une épaisseur de tissu employée dans les essais — environ 2 mm — les rayons qui jouent le rôle le plus important dans le traitement de FINSEN, pénétraient le tissu lupeux en quantité 2 à 6 fois plus grande que quand il s'agit de la peau normale de même épaisseur.

Ce fait explique d'une façon naturelle l'efficacité particulière de la photothérapie locale dans le lupus vulgaris. Par des causes purement optiques les rayons agissent d'une façon élective sur le tissu malade où l'intensité et surtout la pénétration de la lumière sont augmentées.

RESUMEN

La mayor transparencia, de la cual se ha hablado en un artículo precedente, del tejido luposo, comparado con la de la piel normal, ha sido examinada cuantitativamente, sobre todo desde el punto de vista de los rayos químicos.

Se ha podido comprobar que con un espesor del tejido utilizado en los ensayos, de unos 2 mm., los rayos que representan el papel más importante en el tratamiento de FINSEN, penetraban en el tejido luposo en cantidad de 2 a 6 veces más que cuando se trataba de la piel normal del mismo espesor.

Este hecho explica de una manera natural la eficacia particular de la fotografía local en el lupus vulgaris. Por causas, puramente ópticas, los rayos actúan de una manera electiva sobre el tejido enfermo en donde la intensidad, y sobre todo la penetración de la luz, se aumentan.

THE RESULTS OF THE PROPHYLACTIC, POSTOPERATIVE, RADIOLOGICAL TREATMENT OF CARCINOMA OF THE UTERINE CERVIX AT RADIUMHEMMET IN STOCKHOLM

by

Axel Westman

Since the primary radiological treatment of carcinoma of the uterus has become more and more dominating within the gynaecological cancer therapy of Sweden, in connection with the comparatively good results that the statistics of Radiumhemmet of the past years have been able to show, so the interest in the prophylactic, postoperative irradiations has been pushed more and more into the background, as is only natural. However, since the question whether the operative or the radiological treatment of operable cases is to be preferred is still being discussed, it might be of some interest to try to form an opinion as to the extent to which the operative results may be improved upon by prophylactic, postoperative irradiations.

Earlier inquiries into this question have shown that patients who have been given a postoperative treatment have been spared recurrences in far more instances than patients who have only been operated upon. Thus, in 1913, KÖNIG states that of 21 cases of ovarian, cervical, and rectal cancer to which prophylactic, postoperative irradiations had been applied, 20 were free from recurrences, and 9 of these had been observed for more than 2 years. SCHERER states that 48 out of 58 postoperatively treated cases were still free from recurrences at the end of three years. KRÖNIG and GAUSS have made an analysis of 79 cases of prophylactic Roentgen irradiations. Of 43 cases in which the rays were applied unfiltered, 23 died, whereas of 35 cases in which filtered rays were employed, all were free from recurrences. Some of these cases had been followed during six years. In 16 operated and postoperatively irradiated cases HÜSSEY found

that 68,7 per cent were cured, 6,9 per cent improved, 6,2 per cent uninfluenced, and 18,2 per cent dead. KLEIN has made an after-examination of 25 operated and irradiated cases and, with a period of observation of $1\frac{1}{4}$ to 3 years, has found that 4 had recurrences, 4 were dead, 3 were lost sight of, and the rest were cured. Similarly, ADLER has found that after a period of 2 years 66,67 per cent were free from recurrences, though several of them had contracted lesions. Lastly, WARNEKROS, too, has made an extensive analysis that is of particular value partly on account of the bulk of the material and partly because a comparison has been made between patients who have only been operated upon and patients who, during the same period and at the same clinic, have both been operated upon and treated radiologically after the operation. His material comprises 174 cases. Of these, 164 are cancer of the uterine cervix and 10, cancer of the uterine corpus. Some of them were observed for 2 years and a larger number for as much as 5 years. Of the total number, 55 were regularly irradiated. Of the 119 non-irradiated patients, 66 were dead from recurrence, 2 were lost sight of, and 51 were free from recurrences, the rate of recurrence being thus 55,4 per cent. But of the patients, on the other hand, who had had a regular, prophylactic, post-operative treatment, 11 were dead and 44 were free from recurrences, which gives only 18,5 per cent of recurrences. On operation, extensive glandular metastases were found in 9 of the 55 irradiated cases. Three of these had no recurrence. Three cases that also had escaped recurrence were complicated by pregnancy or puerperium. In 4 of the 11 cases with recurrence, the parametria were infiltrated with cancer and in 6 cases there were glandular metastases as well.

The treatment consisted partly in a percutaneous and vaginal application of Roentgen rays alone and partly, in 31 cases, in Roentgen rays in combination with radium or mesotorium applied within the vagina or rectum.

During the period 1914—1922, at Radiumhemmet in Stockholm, 29 cases of carcinoma of the uterine cervix have been treated and after-examined which have been given a prophylactic, radiological post-operative treatment. The treatment has been either vaginal radium radiation alone, with heavily screened preparations, or a combined radium-roentgen treatment, or percutaneous or vaginal roentgen irradiation alone.

The radium treatments have been applied by means of tubes containing radium-bromide. The rays have been filtered through 3 to 4 millimeters of lead. The tubes have been applied in the vagina during the treatment. The doses have, on an average, corresponded to 14 centigrams of radium-bromide and the duration of the treat-

ment has been about 20 hours. The roentgen treatments have been applied in series. Generally, four fields of entry have been employed, two anterior and two posterior. To each field it has been endeavoured to deliver a skin erythema dose. A filter of from 3 to 4 millimeters of aluminium has, as a rule, been employed previously, whereas this filter has of late years been replaced by 0,5 millimeter of copper and the skin focus distance has also lately been increased from 20 to 24—30 centimeters. Simultaneously with the introduction of new and improved dosimeters the technique of dosage has naturally become more reliable. Generally it may therefore no doubt be said that there is a considerable difference between the efficiency of the radiations that have been delivered in the last few years as compared to what it has been before.

For the sake of perspicuity I have divided my material into five groups. The ground of classification has been the number of years during which the patients have been under observation, so that Group I comprises cases that have been observed for at least 5 years (the cases of 1914—1917), Group II, cases observed for 4 years (1918), Group III, 3 years (1919), Group IV, 2 years (1920), and finally Group V, 1 year (1921).

Group I contains 13 cases, one of which, however, has been lost sight of after a period of observation of one year. From the records of the operation it appears that only in 6 cases has it been possible to perform a radical, surgical interference. In the rest of the cases, on the other hand, the tumour had had time to become very extensive before the patient came to be treated. Thus, in 3 cases the tumour was found to have grown into a massiv bulk stretching toward the pelvic walls so that the ureters had to be dissected out through the cancer mass and a great deal of the tumourous tissue had to be left behind. In one case the tumour had spread over the pelvic peritoneum and the bladder, and in the other cases cancer had been anatomo-pathologically proven in glands that could not be radically removed.

Three patients were given radium treatment only, two were subjected only to roentgen treatment, and the others, to a combined roentgen-radium irradiation.

The results of the prophylactic postoperative treatment was that 4 out of the twelve patients whose fates are known, were free from recurrence at the end of 5 years, which corresponds to 33,3 per cent. Among these four cases there were 2 that had been most unfavourable from the very beginning, namely, the one in which the cancer had spread over the pelvic peritoneum and bladder, and also the one that had a massiv tumour extending to the pelvic walls.

It might also be of interest to get an idea of how long time had elapsed before the recurrence took place in the eight cases with fatal termination. It appears then that six patients had died after two years, and one of the remaining ones after 3, and the other after 4 years.

Finally, as regards the treatment, three of the favourable cases have been subjected to a combined roentgen-radium therapy, and one to roentgen treatment only. Of the cases with recurrence, two have been treated with radium alone, one with roentgen alone, and five by the combined method.

Group II comprises three cases, of which two were well operable, whereas the third exhibited affected glands up along the aorta. Only one of the favourable cases was free from recurrence at the end of a period of observation of 4 years, while the other two patients died after 1 and 2 years respectively. One of these, however, broke off the treatment herself before it had time to be completed. The other two patients were treated with combined roentgen-radium irradiation.

Group III comprises six cases, all of which were well operable. Five of them were still free from recurrences at the end of 5 years, which corresponds to 83,3 per cent. Four of them were treated with combined roentgen-radium irradiation, and two with roentgen rays only.

Group IV comprises four operable cases, all of which were free from recurrence at the end of 2 years. One of them was treated only with radium, one only with roentgen rays, and the rest, by the combined method.

Group V, finally, comprises three operable cases, one of which had a recurrence after one year, while the others had none. The case with recurrence was treated with roentgen rays only, and the others, with roentgen and radium rays.

The most valuable figures of the 5 and 4 years periods show only 33,3 per cent of cured cases, and this figure must be considered comparatively low as compared to the figures that are found in large statistics of only operated cases, where the relative percentage of cured cases varies between 25 and 50 per cent. However, these figures are, of course, reached at the leading clinics and should no doubt be accepted as maximum results. On examining more closely the material belonging to Group I it will be seen, however, that the cases were extremely unfavourable from the beginning, so unfavourable indeed, that only six of the cases followed were radically operated upon, while the others exhibited a considerable extension of the cancer. Under such circumstances it is hardly astonishing that the percentage of cured cases is not higher. By comparing these cases with those

belonging to the later groups where the period of observation is shorter, the difference will be found to be marked. It has, however, been possible to perform a radical operation on all the patients in these groups. In Group III the percentage of cured cases is seen to be 83,3, thus exceeding to a material degree the figures relating to Groups I and II (33,3 per cent). This figure corresponds roughly to the one given by WARNEKROS, i. e. 81,5 per cent of non-recurrence.

As to the effect of the technique of treatment on the results, it is impossible to draw any definite conclusions. Seeing, however, that the patients who have been treated with radium alone and have been followed for a longer time, have to be classed among the cases with recurrence, and considering further the difference in result between the earlier and later cases, one may surely have a certain right to suppose that the development which the roentgen technique has experienced has been of some value and that a combined treatment with roentgen and radium irradiation is to be preferred.

No serious roentgen or radium lesions have occurred. In one case, however, the radium treatment produced a recto-vaginal fistula, the width of a lead-pencil, which has not closed up afterwards, nor has it caused the patient any serious discomfort. Some rapidly passing, rectal irritations have occurred in a couple of cases, and in two instances some ulcerations have appeared on the skin of the abdomen but have healed after a fairly short while.

The figures of the statistics are certainly too low and the period of observation too short to allow of any very general conclusions, but, considering especially the rather remarkable results in Group III, these statistics might perhaps, to a certain extent, bear out the view held by several investigators that the prophylactic, radiological post-operative treatment should complete the operative therapy of uterine cancer.

SUMMARY

The writer has made an after-examination of 29 operated cases of cancer of the uterine cervix which have gone through a prophylactic, radiological, postoperative treatment at Radiumhemmet in Stockholm within the period 1914–1922. Of twelve cases that were observed for at least 5 years, four were free from recurrences. Only six of these cases were, however, radically operable from the beginning, whereas in the other cases the tumour was found on operation to have a considerable extension. Two of these remained, nevertheless, free from recurrences. Of six operable cases, after-examined 3 years after the operation was performed, five were symptom-free (83,3 per cent). This comparatively high percentage of cures corresponds to the figures of WARNEKROS' large statistics and might perhaps support the view that a

radiological postoperative treatment should complete the operative therapy of uterine cancer.

ZUSAMMENFASSUNG

Verf. hat 29 operierte Fälle von Krebs des Cervix uteri nachuntersucht, die während des Zeitraums von 1914—1922 im Radiumhemmet zu Stockholm einer prophylaktischen radiologischen postoperativen Behandlung unterzogen worden waren. Von zwölf Fällen, die seither wenigstens 5 Jahre beobachtet sind, blieben vier frei von Rezidiven. Nur 6 von diesen Fällen waren aber von vornherein radikal operabel, während sich bei den andern unter der Operation erwies, dass der Tumor eine beträchtliche Ausdehnung besass. Zwei von diesen blieben gleichwohl frei von Rezidiven. Von 6 operabeln Fällen, die 3 Jahre nach der Operation nachuntersucht wurden, waren fünf symptomfrei (83,3 Prozent). Diese verhältnismässig hohe Perzentzahl von Heilungen entspricht den Ziffern der grossen Statistik von WARNEKROS und mag vielleicht die Anschauung stützen, dass die operative Therapie des Uteruskarzinoms durch radiologische postoperative Behandlung ergänzt werden soll.

RÉSUMÉ

L'auteur a examiné 29 cas, opérés pour cancer du col utérin, qui pendant la période 1914—22 avaient été soumis à un traitement radiologique post-opératoire prophylactique au Radiumhemmet de Stockholm. Sur 12 cas, observés pendant au moins 5 ans, 4 étaient exempts de récidives. Dans six cas seulement il etait possible de pratiquer une opération radicale d'emblée dans les autres cas par contre, la tumeur fut trouvée d'une extension considérable à l'opération. Deux de ces derniers cas restèrent cependant exempts de récidives. Sur les 6 cas opérés, examinés 3 ans après l'opération cinq étaient exempts de symptômes (83,3 %). Ce pourcentage de guérison, relativement élevé, s'accorde avec les chiffres de la statique étendue de WARNEKROS et pourra peut-être servir d'appui à l'opinion que le traitement radiologique postopératoire doit compléter la thérapie opératoire du cancer utérin.

RESUMEN

El autor examinó 29 casos operados de cancer en el cuello uterino, que durante el periodo de 1914 a 1922 fueron sometidos a un tratamiento radiológico post-operatorio profiláctico en Radiumhemmet de Estocolmo. De 12 casos observados por lo menos durante 5 años, 4 estaban exentos de reproducciones. En 6 casos tan sólo fué posible practicar una operación radical, en los otros casos por el contrario, el tumor tenía una extensión considerable en el momento de la operación. Dos de estos últimos casos, sin embargo, estuvieron exentos de reproducciones. De los 6 casos operados, examinados 3 años después, cinco estaban exentos de síntomas (83,3 %). Este porcentaje de curación, relativamente elevado, está de acuerdo con las cifras de la estadística presentada por WARNEKROS y tal vez podrá servir de apoyo a la opinión que el tratamiento radiológico post-operatorio debe completar la terapia operatoria del cancer uterino.

REFERENCES

ADLER: Radiumbehandlung maligner Tumoren in der Gynäkologie, 1918.
DIETERICH: Beitrag z. Röntgentherapie in d. Gynäkologie. Fortschr. a. d. Geb. d. Rtgstr. Vol. 21.
FORSSELL: Übersicht über die Resultate der Krebsbehandlung am Radiumheim in Stockholm 1910—1915. Fortschr. a. d. Geb. d. Rtgstr. Vol. 20.
HÜSSEY: Zwei Jahre Radium im Frauenspital Basel. Monatschr. f. Geb. u. Gyn. Vol. 46.
KELEN: Über Röntgenbehandlung in der Gynäkologie. Monatschr. f. Geb. u. Gyn. Vol. 34.
KLEIN: Mehrjährige Erfolge der kombinierten Aktinotherapie bei Karzinom des Uterus und der Mamma. Monatschr. f. Geb. u. Gyn. Vol. 41.
RUNGE: Praktikum der gynäkologischen Strahlentherapie. 1921.
WARNEKROS: Der Wert prophylaktischer Bestrahlungen nach Karzinom operationen und die Erfolge der Rezidivbehandlung mittels Röntgenlicht und Radium. Münch. Med. Woch. 1917, Nos. 27 and 28.

FROM THE ROENTGEN CLINIC OF THE BISPEBJERG HOSPITAL, COPENHAGEN
CHIEF: DR. CHR. I. BAASTRUP

THE ROENTGEN-DIAGNOSIS OF DIAPHRAGMATICAL HERNIA AND EVENTRATION

by

David Ottosen

While a diaphragmatical herniæ is a rather frequent suffering a diaphragmatical eventration is relative seldom. 1916 STROM has found about 25 cases mentioned in literature. Until 1920 SCHLECHT and WELS have collected 44 cases. BOUQUET, MASSELOT and JAUBERT DE BEAUJEN (Journal de Radiologie, Jan. 1922) speak of a recently published Italian statistic (SMAJA) on 46 cases, whereto the three authors add one. Finally CLOPTON (Aug. 1923) speaks of two cases.

A diaphragmatical eventration as a rule is to be found on the left side. Cases of the disease on the right, however, have been described (GLAESNER, EPPINGER and WERNSTEDT). The pathogenesis is indistinct. It is mostly supposed to be an inbred suffering. Several authors have ascribed the phrenical nerve great importance in regard to the pathogenesis, thus NEUMANN, who thinks that a diaphragmatical eventration comes up through considerable injuries of the phrenical nerve. Several cases of eventration are mentioned where the phrenical nerve is found degenerated (MOTZFELDT, NEUMANN, BELTZ and KRAUSE).

In the cases microscopically examined an extensive fat degeneration of the diaphragm has been found (BENDA, NEUMANN, DOERING a. o).

An eventration is often symptomless, sometimes it is attended by dyspeptic attacks, respiration troubles and now and then palpitation of the heart, quite the same symptoms found by greater diaphragmatical herniæ. The findings by the clinical examination are also the same.

The differential diagnosis can thus be very difficult. The significance and the difficulty of diagnosing correctly appears from many cases mentioned in literature (HIRSCH, HILDEBRANDT, HESS, EGGELING, RIESEL a. o.). On the Roentgen picture will be seen by the diaphragmatical herniæ as well as by eventration that the bound between the lung and the stomach or the intestine is formed by a narrow, curved, more or less regular line, which either is due to the stomach-wall (eventually the wall of the intestine) or this plus the diaphragm. To diagnose the difference between the eventration

and the hernia, stress has been laid on the movements of this boundline during the respiration and under irritation of the phrenical nerve. The movements should be paradoxical with a hernia, with an eventration, normal. If a hernia is adherent it will very easily be supposed to follow the movements of the diaphragm, and if the degeneration by an eventration is very considerable it is just possible that the muscling is not capable of asserting itself, so that the diaphragm to a certain extent will follow the suck effect from the thorax, whereat paradoxical movements may come up. Some authors thought, that if the shadow from the stomach-wall was seen separated from the curved line which is perceived as the shadow from the diaphragm, it must be an eventration. A diaphragm hernia which has a peritoneal sac containing parts of the stomach as well as parts of the colon would probably give a similar picture. In a differential diagnostic aim, has moreover been applied an establishment of pneumo-peritoneum with following Roentgen examination, thus in two cases described by SCHLECHT and WELS. By the one, an eventration, the left diaphragmhalf would be seen separated from the below situated abdominal organs. In the other case a pneumothorax came up immediately after the airinflating, and the diagnosis, a diaphragmatical hernia, was therewith proved.

In suitable cases it seems, however, that the Roentgen examination only, is sufficient to attain a chief help to the diagnosis, when the attention is especially paid to the question, the hernial ring. Sidepictures thus seem to be of importance. This understanding apparently lead to the right result in the following case.

The patient has been Roentgen examined with three years intervals. On the left the bound between the thorax and the abdomen in either case is formed by a rather regular line which rises about 8 centimeters higher than the right diaphragm dome (figs. 1 & 2).

The line in question is moved less on the left than on the right side, but the movements are of a normal type. After an opaquemeal the patient is examined in the erect position (fig. 3), lying on the back (fig. 4), in the prone position (fig. 5), lying on the side (fig. 6), and standing with the plate held against the side (fig. 7).

Similar characteristical pictures as fig. 7 have been described before (FREUND & SCHWAER, ASSMANN, BECKER, KIENBOECK, SCHLECHT and WELS). The two last mentioned authors have tried to explain the picture as follows:

When the space upwards in the abdominal cavity is increased, whether this happens through an eventration or a hernia, the place will at once be filled out by the viscera, most often the stomach. The best fixed places of the stomach are the cardia and the pylorus.

The most mobile part of the stomach will ascend to the upper pathological roof of the abdominal cavity. The pylorus and the cardia will then near each other, while the remaining part of the stomach will form an upward convex curve in which the small intestine and the colon place themselves.

In none of the pictures (especially the side pictures) signs of a hernial ring are found. By the examination in 1920 the height-difference between the two diaphragm-halves was exactly the same as in 1923, namely 8—9 centimeters. These facts, together with that the suffering was practically symptomless, are supposed to entitle to diagnose diaphragmatical eventration. If these pictures are compared with the pictures of the diaphragmatical hernia the roentgenograms made with the patient in the erect position, plate anteriorly, tube posteriorly (fig. 8), with the patient lying on the left side, perpendiculary roentgenographed (fig. 9), on the right side, roentgenographed in the dorso ventral view (fig. 10), the roentgenogram of the mucous membrane (fig. 11), after the method stated by DR. BAASTRUP (Acta Radiol. Vol. 3 nr. 12—13, pag. 180), a marked difference will be seen. On the roentgenograms of the hernia a hernial ring is present (to a special extent on the side-picture). It may be noted that by fluoroscoping the patient with the hernia the movements of the diaphragm on both sides were of a normal type, but the line which forms the upper limitations of the airfilled space of the stomach did hardly move under the respiration.

In a later case from another hospital the author has diagnosed eventration, because the roentgenograms taken in various planes showed no sign of a hernial ring. The autopsy confirmed the diagnosis.

SUMMARY. The author considers it frequently possible by Roentgen examination to differentiate between the diaphragmatical hernia and eventration by the presence or the absence of a hernial ring, the patient and the tube being variously adjusted.

The roentgenograms taken from side to side in the vertical and in the horizontal position seems especially to be of importance.

ZUSAMMENFASSUNG. Autor ist der Ansicht, dass es durch Röntgenuntersuchung häufig möglich ist, je nach dem Vorhandensein oder Fehlen eines Hernialringes, zwischen Zwerchfellhernie und Eventratio zu unterscheiden, indem man Patienten und Röntgenröhre in verschiedener Weise zueinander lagert.

Die von Seite zu Seite aufgenommenen Röntgenogramme in vertikaler und horizontaler Stellung scheinen besonders von Bedeutung zu sein.

RÉSUMÉ. L'auteur estime que par l'examen radiologique il est souvent possible de poser le diagnostic différentiel de l'hernie diaphragmatique d'avec l'éventration par la présence ou l'absence de l'anneau herniaire; le malade et le tube étant placés dans différentes positions l'un à l'autre.

Les radiographies prises latéralment dans les positions verticale et horizontale surtout, peuvent avoir une grande importance.

RESUMEN. El autor considera que por el examen radiológico resulta posible, a menudo, presentar un diagnóstico diferencial de la hernia diafragmática y de la fractura de los músculos, por la presencia o la ausencia del anillo hernial; el enfermo y el tubo colocados en diferentes posiciones entre sí.

Las radiografías tomadas lateralmente en la posición vertical y horizontal, sobre todo, pueden tener una gran importancia.

LITERATURE

Assmann: Hernia u. Eventr. diaphrag. Fortschrit. d. Röntgensthr. Bd. 26. S. 1.
Becker: Röntgenuntersuchungen bei Hernia u. Eventrat. diaphrag Fortschr. d. Röntgensthr. Bd. 17. H. 4.
Benda: Fall von Eventrat. diaphrag. Deutsch. med. Wochenschr. Vereinsbeilage. S. 350.
Clopton: Eventrat. of the Diaphrag. Annuals of Surgery. August 1923.
Doering: Ueber Eventrat. diaphrag. Deutsch. Arch. f. klin. Mediz. Bd. 72. 1902. S. 407.
Eggeling: Der anatomische Befund in einem bekannten Fall von Eventr. diaphrag. Münch. med. Wochenschr. 1912.
Eppinger: Allgemeine u. spez. Pathologie des Zwerchfells.
Freund u. Schawer: Zwerchfellshernie und Pyopneumothorax nach Lungenabsces. Münch. med. Wochenschr. 1916. S. 1532.
Glaesner: Ueber Eventr. diaphrag. Fortschrit. d. Röntgensthr. Bd. 24. H. 3.
Helsted: Et Tilfælde af opereret Hernia diaphragmatica. Hospitalstidende 1918. S. 881.
Hildebrandt u. Hess: Zur Differentialdiagnose zwischen Hernia diaphragmatica und Eventratio diaphragmatica. Münch. med. Wochenschr. 1905. S. 745.
Hirsch: Zur klinischen Diagnose des Zwerchfellshernie. Münch. med. Wochenschr. 1900. S. 996.
Kienböck: Über Zwerchfellshernie bei Kindern. Fortschr. d. Röntgenstrahlen. Bd. 21. H. 4.
Krause: IX. Kongress der Deutschen Röntgengesellschaft. Münch. med. Wochenschrift 1913. S. 778.
Lichtenstein: Till kännedomen om Eventratio diaphragmatica. Svenska Läkaresällskapets Handlingar 1916. S. 1116.
Motzfeldt: Om Hernia og eventratio diaphragmatica. Norsk Magazin for Lægevidenskab. 1912. S. 1693.
Neumann: Zur Frage der Relax. diaphrag. Deutsch. med. Wochenschrift. 1919. S. 905.
Panner: Röntgentbilledet ved Hernia diaphrag. Hospitalstidende 1918. S. 890.
Riesel: Zwerchfellshernien. Münch. med. Wochenschr. 1907. S. 637.
Schaldemose: Om Hernia diaphragmatica. Hospitalstidende 1918. S. 849.
Schlecht u. Wels: Zur R-diagnose d. Relaxatio diaphrag. Fortschr. d. Röntgensthr. B. 27. H. 5. S. 544.
» Zur R-diagnose d. Relaxatio diaphrag. Fortschr. d. Röntgensthr. B. 27. H. 3. S. 244.
S. Ström: Nordisk kirurgisk Forenings 11te Møde 1916.
Wernstedt: Ett fall af relaxatio (och hernia?) diaphragmatica. Ugeskrift f. Læger 1919. S. 459.

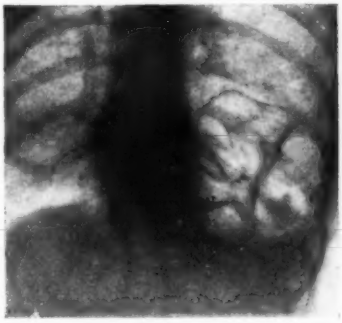


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

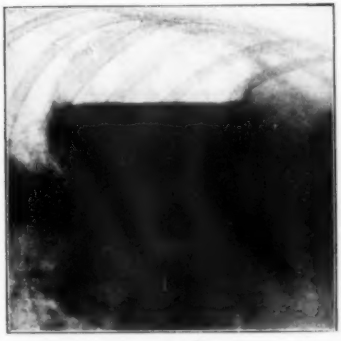


Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

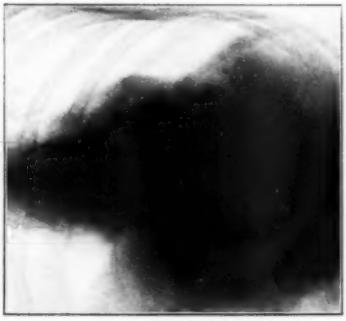


Fig. 10.

Fig. 11.

SPOTTED POST-TRAUMATIC ATROPHY OF THE BONES OF THE KNEE-JOINT

by

Chr. M. F. Sinding-Larsen, Christiania

The case I am going to report here is of interest from several points of view, both diagnostic and therapeutic, and not least from an insurance standpoint.

N. N., steward, aged 40 years. A sister of the patient had died in pulmonary tuberculosis, but he had himself always been in good health until June 1922 when a herring-barrel fell down on him and struck the inner side of his right knee which *at once* swelled and gradually became stiff. He was paid off in Oct. 1922 (the injury had been notified to the State institution for workmen's accident insurance) and was treated elsewhere for tuberculosis of his knee, the treatment consisting partly of plaster-of-Paris bandages and partly of sun-light baths. In May, 1923, he came to see me. He had a limp and walked with the aid of a stick. His right leg was kept extended in the knee-joint and was very sun-burnt. The knee was swollen (its circumference at the level of the patella being increased by 3 centimeters); the motion in the knee-joint was limited to twenty degrees of flexion from full extension; the musculature of the thigh was atrophic.

Clinically, the case looked like a *fibrous fungus*. *Roentgen*ograms of the knee showed a peculiar spotted appearance due to a decrease of lime selts in the epiphyses and metaphyses of femur and tibia, and also in the patella, partly with strong sclerosis around the rarified spots (Cf. the report of GÖSTA FORSSELL). At first my diagnosis also was »tuberculosis», and I proposed resection as being at any rate the quickest treatment. The patient agreed to this. To be on the safe side, however, I examined him beforehand with tuberculin, first after the method of PIRQUET, and then by means of subcutaneous injections, increasing the doses to as much as 2.5 centigrams. *All tests gave, however, an absolutely negative result.*

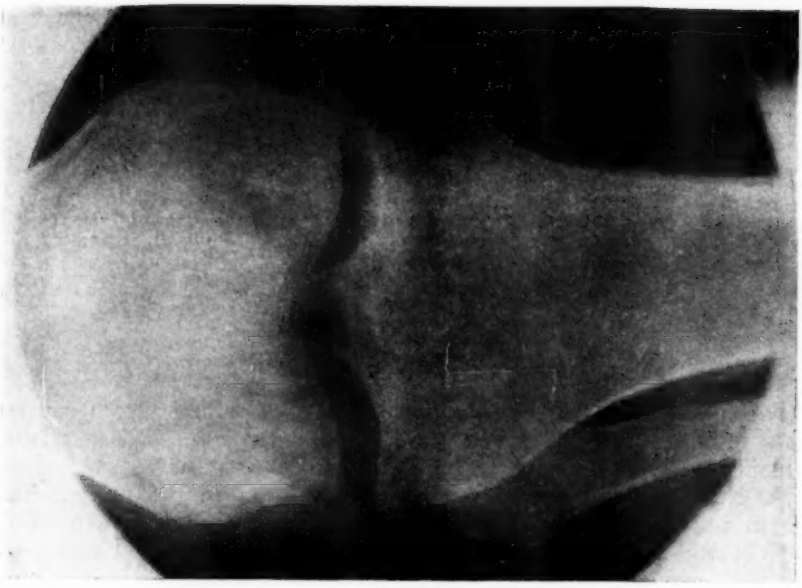


Fig. 2.

Fig. 1.

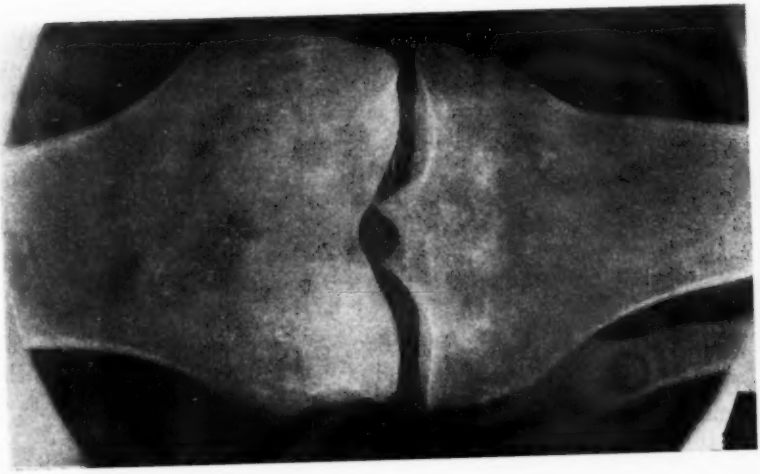


Fig. 4.

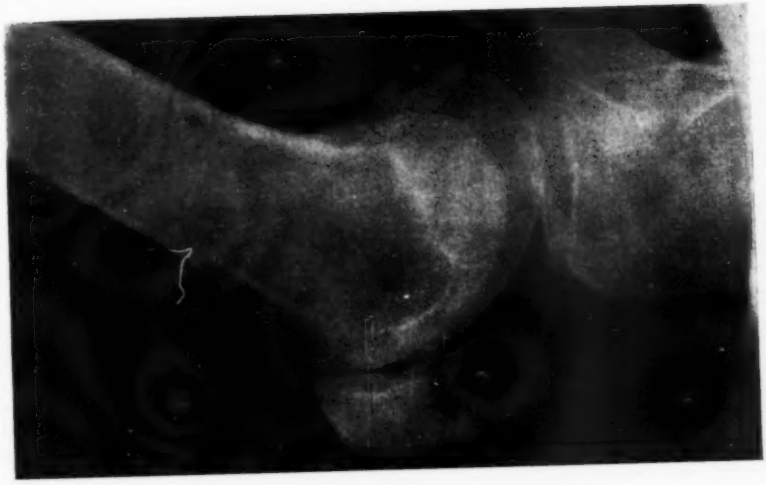


Fig. 3.

Fig. 2.

Fig. 1.

The case was now diagnosed »chronic arthritis with spotted atrophy of the bone following traumatic hemarthros». The resection was abandoned, and the patient was treated instead with diathermi, massage, and cautious active exercises. He recovered quickly and went to sea again in Sept. 1923.

In Feb. 1924, he wrote me from a foreign port that the motion and strength in his knee were good, and on Sept. 3, 1924, he turned up in person to show himself. He had then been at sea a whole year, and was in perfect health. His knee was of normal appearance, with normal and quite painless motion; the musculature of the thigh was that of an athlete. The roentgenograms showed a normal structure of the bone, and the rarefied spots were hardly discernible. In so far, thus, there was a *restitutio ad integrum*, but the patella showed signs of exostoses (a beginning arthritis deformans?).

Without the tuberculin tests the case was very difficult to interpret, and the opinions expressed by the authorities who, without being told about the results obtained by the tuberculin tests, saw the roentgenograms, were very diverging.

At the congress of the Nord. Kir. Förening in Stockholm, June 1923, I showed the roentgenograms to GÖSTA FORSSELL who kept them for closer examination and eventually for publication, and in April of this year he sent me the following statement on them (Fig. 1 and 2):

»The normal appearance of the spongy tissue of the lower end of the femur and of the upper end of the tibia is changed in a characteristic manner, presenting a spotted rarefaction of the bone trabeculæ in the centre of the condyles and also diffuse sclerotic changes around these rarefied areas. These changes are most marked in the centres of the metaphyses, while the normal appearance of the spongy tissue is better preserved in the epiphyses and especially near to the articular surfaces. Also in these areas, however, the spongy tissue appears more diffuse and thinner than normal. The roentgenogram of the patella, especially of its upper part, shows decalcified spots similar to those seen in the metaphyses, and also very pronounced sclerotic changes around these rarefied areas. The cortical osseous substance appears to be preserved over the entire extents of the articular surfaces and the articular cartilages seem to be of normal height. The articular capsule throws a denser shadow than normal and the ligamentum patellae is slightly bulging. A small deposit of lime is seen at the site of the crucial ligaments, but otherwise there are no visible calcifications or bone formations in the soft tissues.

This articular picture is not easy to judge with absolute certainty. Against tuberculosis argue, firstly, the fact of the rarefied areas having a deep position inside the bone, mainly in the metaphyses, secondly, the marked sclerotic changes around these rarefied areas; and, lastly, the fact that the contours of the articular bony surfaces are perfectly preserved in spite of the great extension of the process about the joint and also the pre-

served height of the articular cartilages. These two latter facts also argue against an arthritis due to infection or a chronic destructive arthritis. Nor are there any signs of an arthritis deformans. The increased density of the articular capsule and the bulging of the ligamentum patellæ indicate, of course, a chronic synovitis. The existing changes in the bone have very likely been caused by nutritive disturbances in the bone, due to a chronic inflammatory synovitis. The picture is, however, of an uncommon type and I cannot remember having ever met with a quite identical picture in the whole of my experience, nor have I been able to find it in the literature I have had access to.

A picture of this nature, departing from the normal, is rather apt to make one consider the possibility of a luetic change, and especially since the sclerotic alterations are so marked within the bone, but the picture does not present the appearance usually found in luetic osteoarthritis.

A tumour formation is, I think, quite excluded.

The immediate result of my reflections on this uncommonly hard-cracked diagnosis would be a probable diagnosis of a chronic inflammatory change of the articular capsule with secondary nutritive disturbances in the adjacent bones.

Sincerely yours (Signed) *Gösta Forssell.*»

With regard to the roentgenograms of Sept. 3 of this year it is to be noted that they were taken with harder tubes than the first roentgenograms and have therefore become somewhat *grayish;* but they show nevertheless in an unmistakeable manner that the structure is normal once more. GÖSTA FORSSELL makes the following statement on these new roentgenograms (Fig. 3 and 4):

»The roentgenograms taken Sept. 23, 1924, show a very considerable increase of lime in the bones of the right knee-joint. The circumscribed sports of decalcification, too, have mostly become restored to normal conditions, though there are still some spots indicating a slight decrease of lime, both in the femur and the tibia. The articular cartilages appear unchanged. There is no visible deformation of the articular surfaces.»

There is hardly any need to comment this case in detail. All surgeons with some experience in this field are sure to have seen similar cases and to have been doubtful about them. In his book »Die Principien der Orthopædie», 1923, (Pag. 69) PATRIK HAGLUND calls attention to the spotted athrophy of the bones and to the faulty diagnoses that often are made in this disease and which prove disastrous to the patients.

The *genesis* of the atrophy, or the question why post-traumatic atrophy is sometimes diffuse and sometimes spotted, will not be treated of here. In publishing this pregnant case I have only wanted to draw attention to a condition which, for the sake of the patient, it is of the utmost importance for the surgeon to know and, when occasions arise, to be able to *recognize* and *treat correctly.*

SUMMARY. The writer reports a case of post-traumatic disease of the knee, which he got under his care in May 1923. The patient, a man of forty, had been treated elsewhere for tuberculosis of his knee which bore such a striking clinical semblance of a fibrous fungus (tumor albus fibrosus) that the writer also thought of performing a resection. The patient, however, was first subjected to tuberculin tests, all of which yielded negative results. Roentgenograms of the knee showed peculiar atrophic spots in the condyles and in the patella. — The case was then diagnosed *chronic post-traumatic arthritis with spotted bone atrophy*. A treatment consisting of massage and diathermi was instituted, and at the end of six months the case had recovered completely, clinically as well as *roentgenologically*. As to the roentgenograms the reader is refered to the detailed description by GÖSTA FORSSELL in the text proper.

ZUSAMMENFASSUNG. Der Verf. berichtet über einen Fall von posttraumatischer Knieaffektion bei einem 40 jährigen Mann, den er im Mai 1923 in Behandlung bekam. Der Patient war anderwärts wegen Tuberkulose im Knie behandelt worden und dieses glich klinisch so sehr einem fibrösen Fungus (Tumor albus fibrosus), dass auch Verf. daran dachte Resektion vorzunehmen. Der Patient wurde jedoch zuerst mit Tuberkulin untersucht, wobei alle Proben negativ ausfielen. Die Röntgenbilder des Knies zeigten eigentümliche atrophische Flecken in Kondylen und Patella. — Die Diagnose wurde nun auf *chronische posttraumatische Arthritis mit fleckiger Knochenatrophie* gestellt und nach Behandlung mit Massage und Diathermie trat binnen einem ½ Jahr vollkommene Heilung ein — klinisch und *röntgenologisch*. Betreffs der Röntgenbilder sei auf GÖSTA FORSSELLS ausführliche Beschreibung im Texte verwiesen.

RÉSUMÉ. L'auteur rapporte un cas d'affection posttraumatique du genou qu'il reçut en traitement au mois de mai 1923. Le malade, un homme de 40 ans, avait été traité ailleurs pour tuberculose du genou qui avait une telle ressemblance clinique avec une tumeur blanche fibreuse que l'auteur pensait nécessaire de faire la résection. Le malade fut cependant d'abord soumis à l'épreuve de la tuberculine avec résultats négatifs à tous les examens. La radiographie du genou présentait des taches atrophiques singulières dans les condyles et dans la rotule. On porta maintenant le diagnostic d'*arthrite chronique posttraumatique avec atrophie osseuse tachetée* et après un traitement au massage et à la diathermie la guérison complète se fit dans le cours de 6 mois — clinique et *radiologique*. Au sujet des radiographie il faut se rapporter à la description minutieuse de GÖSTA FORSSELL dans le texte.

RESUMEN. El autor presenta un caso de afección post-traumática de la rodilla, de cuyo tratamiento se encargó en el mes de mayo de 1923. El enfermo, un hombre de 40 años, había sido curado en otra parte como tuberculosis de la rodilla, que presentaba una gran semejanza clínica con un tumor blanco fibroso, del cual el autor pensaba practicar la resección. El enfermo fué previamente sometido a los ensayos con tuberculina, con resultados negativos en todos los exámenes. La radiografía de la rodilla presentaba manchas atróficas especiales, en los condilos y en la rótula. El diagnóstico fué entonces hecho de *artritis crónica post-traumática con atrofia ósea manchada* y después de un tratamiento por masaje y por la diatermia, se presentó la completa curación en el transcurso de 6 meses. Por lo que se refiere a las radiografías debe estudiarse la descripción minuciosa hecha en el texto por GÖSTA FORSSELL.

FROM THE COUNTY HOSPITAL OF KARLSKRONA. CHIEF: DR. R. LUNDMARK

TWO CASES OF TYPICAL OSTEOCHONDROPATHY OF THE MEDIAL SESAMOID BONE OF THE FIRST METATARSAL

by

Axel Renander

I am able to report here two cases of an osteochondropathy of the medial sesamoid bone of the great toe, and, as far as I know, this condition has never been described before.

Case I. Rolf S., age 13. Was admitted to the hospital April 24, 1924. Except for the measles he has had no infantile diseases. No glandular complaint as a child. Was quite well until a year ago when, without any known cause, pain developed in both feet, being localized to the medial half of the anterior arches. The pain which only came on when the patient was walking or otherwise standing on his legs soon subsided after a few days of rest. He was then free from symptoms until a fortnight before his admission to the hospital, when the same complaint re-appeared in his left foot. No trauma was known to have occurred before either of these periods of pain.

The patient was limping very much when admitted to the hospital and for pain he could not step on the fore part of his left foot. There was no spontaneous pain. Objectively, the medial sesamoid bone underneath the head of the first metatarsal could be felt to be distinctly tender. In other respects there was nothing abnormal.

Roentgen examination of the left foot (Figs. 1 and 2): The medial sesamoid bone underneath the head of the first metatarsal is seen to be deformed, considerably flattened in the dorso-plantar direction and also slightly from side to side as compared with the lateral sesamoid bone which presented a normal appearance and an even oval shape. The dorsal surface of the medial sesamoid bone is concave, the concavity corresponding to the convexity of the plantar surface of the head of the first metatarsal; its plantar surface is convex. The outlines of the bone are notched in fine waves and uneven. The normal bony structure is replaced by spots of increased density. In the dorso-plantar roentgenogram the bone seems, as it were, to be divided into three unequal fragments.

Roentgenograms of the corresponding sesamoid bone of the right foot shows analogous changes (Figs. 3 and 4). The fragments are here seen still more distinct and appear to be at least three in number.

The patient was treated with rest in bed and compresses of wadding and was discharged free from symptoms April 30, 1924.

Case II. Mrs. Mary G., age 36. Was admitted to the hospital May 30, 1924. Had always been in good health until three or four years ago when a pain, localized to the medial half of the anterior arch of her right foot, began to develop and gradually increased in intensity. As a rule, the symptoms were absent in the morning, and did only appear after the patient had been up and about for a while. The pain frequently caused the patient to step on the outside of the foot. There was no spontaneous pain. The patient could not remember having previously suffered any trauma. As a child she had never had any troubles with her feet.

When admitted to the hospital, the patient was limping slightly, keeping her right foot somewhat supinated. The medial sesamoid bone underneath the head of the first metatarsal presented a marked pressure-tenderness.

Roentgen examination of the right foot (Figs. 5 and 6). The medial sesamoid bone underneath the head of the first metatarsal is compressed from above downward and divided into one small and three larger fragments, the dorsal surfaces of which form together a concavity corresponding to the convex plantar surface of the head of the first metatarsal. The fragments throw dense shadows due to an increased amount of lime salts and the interspaces between them are so wide as to give the medial sesamoid bone a proximal-distal extension of 15 millimeters. The corresponding measurement of the lateral sesamoid bone, which presents the normal rounded eggshape, is 10 millimeters. The structure of the bone is irregular and shows spots of increased amount of lime-salts.

Roentgenogram of the left foot (Figs. 7 and 8). The medial sesamoid bone underneath the head ot the first metatarsal is divided into two fragments, of which the proximal one appears to be half the size of the distal. Together they are slightly larger than the normal lateral sesamoid bone. The medial sesamoid bone is flattened from above downward, its dorsal surface forming a concavity corresponding to the convexity of the plantar surface of the head of the first metatarsal. The structure of the bone presents no distinct departures from the normal and its contours are smoothly rounded and well-defined.

The changed medial sesamoid bone of the right foot was extirpated (Dr. R. LUNDMARK). The patient was discharged June 5, 1924 and has since then been free from symptoms.

Microscopic examination of the extirpated bone (Dr. O. REUTERWALL). 1. The large fragment: The osseous nucleus is surrounded by cartilage and split into two unequal pieces the opposed surfaces of which are almost plane. These pieces are joined together by a strand of connective tissue about one half millimeter broad. A great portion, including the bone marrow, of the larger piece is necrotic; the lesser one presents some small necrotic areas in which, however, the nuclei of the marrow cells have taken the stain, at least partially (the central parts of the originally single osseous nucleus seem to be involved in the necrosis). Round the osseous tissue is seen cartilaginous tissue the cells of which at several places are seen to be distinctly columnar. A small number of giant cells, some of them lying in lacunæ of the bone,

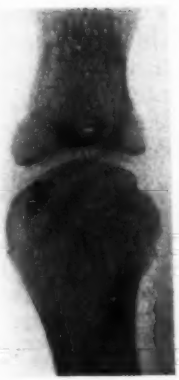


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

are found both in the connective tissue joining the two pieces of the osseous nucleus, and in the bonne marrow. Here and there are small round-cell infiltrations. 2. The small fragment: The cartilaginous tissue presents no necrotic changes. An in-growing vascular connective tissue, with metaplastic formation of bone from the cartilage.

Clinically and roentgenologically, the two cases reported above present, thus, the same typical picture. Without having previously suffered any trauma, both patients experienced pain when the foot was subjected *to weight bearing*, the pain being localized to the

medial sesamoid bone underneath the great toe. By a short rest in bed the pain could be made to subside and disappear.

As to the microscopic picture, it tallies exactly with the changes that have been described in connection with extirpated malacic semilunar bones in children (described in detail by SONNTAG in »Fortschritte auf dem Gebiete der Röntgenstrahlen», 1923).

As regards the roentgen picture, it presents, as we have seen, the same characteristics as the forms of osteochondropathy described by KÖHLER, KIENBÖCK, PERTHES, WALDENSTRÖM, SCHLATTER, and others. The same fragmentation, the same baked and structureless condition, and the same increased density of the osseous nucleus, is found in the sesamoid bones described above.

Osteochondropathy in its various forms is nowadays generally conceived as an abnormal state due to a disproportion existing between weight and bearing-power under normal performance of work. If a bone does not answer the requirements made upon it, it gives way and becomes deformed at the pleasure of the forces surrounding it. The anterior arch of the foot is exposed to considerable strain and has to bear the whole weight of the body at a certain moment in walking. It is therefore easily conceived that a bone of inferior quality, close to one of the fulcra, is doomed to destruction.

The deformity in the two cases described seems to me characteristic. The dorsal surfaces of the altered sesamoid bones present, as it were, an impression of the corresponding surfaces of the metatarsal bones. It looks as though the less resistant sesamoid bone had been indented by and shaped after the head of the first metatarsal. KÖHLER, among others, has observed deformed sesamoid bones in connection with high-grade deformities of the foot, but the genesis in the two cases reported above has probably been another, partly because there were no other deformities of the foot, and partly because the normal structure of the bone seemed to have been obliterated, roentgenologically as well as microscopically.

In the third edition of »Grenzen des Normalen und Anfänge des Pathologischen im Röntgenbilde» KÖHLER points out that split sesamoid bones may occur normally but calls in question whether in some of these instances it may not be a case of fracture. The absence of trauma in the histories of my two cases argues, however, against a fracture being the primary etiology. The fact that my cases resemble in other respects the various forms of osteochondropathy tells me that in the same manner in those cases the primary cause must here be sought in the constitution of the bone itself. If the physiological solidity of a bone is reduced, the result will, of course, easily be a spontaneous fracture, and the above-mentioned

compression of the sesamoid bones may be regarded as a depressed fracture, but then I think it would be most correct to avoid entirely the term fracture.

Osteochondropathy in its various forms occurs, as is well known, mostly at the time when the skeleton is developing. The investigations that have been made up to the present time have shown that it is most common between the ages of five and fourteen. W. MÜLLER explains this as being due to the fact that circumstances are particularly unfavourable with regard to the resistance of the bones in proportion to the requirements made upon them during this period. In one of my cases the patient was at the typical age, whereas the patient in the other case did not develop any symptoms until about the age of thirty-five. The latter case forms, of course, an exception in so far as the changes in the bones did not become manifest at the characteristic age. That changes of the kind described above may exist without any manifest symptoms is proved by both cases. In my first case the patient presented the same roentgenological picture of the sesamoid bones of both feet, while he experienced discomfort only from his left foot. It is, moreover, a wellknown fact that a similar condition is met with in the other forms of osteochondropathy (for instance, KÖHLER's disease of the scaphoid of the ankle). The extirpated bone in the second case shows all the typical changes, roentgenologically as well as microscopically, and it is perhaps possible that the changes have existed since the youth of the patient. What has caused the disease to become manifest at this comparatively late period of life cannot be decided with certainty (formative irritation due to a displacement of the fragments?). The medial sesamoid bone of the foot that never displayed any symptoms shows a splitting of the nucleus and an impression on its dorsal surface but no distinct structural changes of the bone, forming thus a kind of transition to the physiologically occurring splittings of the osseous nuclei of the sesamoid bones that have been observed by KÖHLER. It may be called very much into question whether this splitting which is interpreted as a physiological occurrence should not be regarded even now as being an osteochondropathy or at least, if it is physiological, may be thought to predispose to the development of such a condition.

On the basis of the characteristic picture, roentgenological as well as clinical, of the disease, and also on the strength of the microscopic changes, I am therefore inclined to interpret the pictures as being due to a *disease sui generis*. And considering the great likenesses that my two cases bear to the group of diseases denominated by the common name of osteochondropathy, such as morbus

KÖHLER, KIENBÖCK, SCHLATTER, and others, I am further bent to include these cases in this group.

In conclusion I beg to express my respectful thanks to Professor ALBAN KÖHLER, Dr. R. LUNDMARK, Professor G. FORSSELL and Dr. O. REUTERWALL for the great kindness and interest they have shown.

SUMMARY

The writer refers two cases of a typical, not before described, disease of the medial sesamoid bone of the first metatarsal. In the first case there was trouble only from the left foot, whereas the roentgen picture showed the same changes on either side. In the other case all the typical changes existed only in the sesamoid bone of the right foot — with pains — the corresponding bone on the left foot forming a sort of transition to the as physiological conditions apprehended bipartition of the sesamoid bone. Due to the conformity of the roentgen picture, the microscopic alterations — in the second case the bone in question was extirpated — and the clinical symptoms to the osteochondropathy-diseases (morbus KÖHLER, PERTHES, SCHLATTER etc.) these two cases are read as belonging to this group.

ZUSAMMENFASSUNG

Verf. berichtet über zwei Fälle von typischer, bisher nicht beschriebener Erkrankung des medialen Sesamknochens unter dem ersten Metatarsale. Im ersten Falle waren nur seitens des linken Fusses Beschwerden vorhanden, während das Röntgenbild auf beiden Seiten die gleichen Veränderungen zeigte. Im zweiten Fall fanden sich im Sesamknochen des rechten Fusses — mit Schmerzen — alle typischen Veränderungen; der entsprechende Knochen des linken Fusses bildete eine Art von Übergang zu der als physiologischer Zustand angenommenen Zweiteilung des Sesamknochens. Auf Grund der Übereinstimmung des Röntgenbildes, der mikroskopischen Veränderungen — im zweiten Fall wurde der in Rede stehende Knochen extirpiert — sowie der klinischen Symptome mit denen der Osteochondropathie-Erkrankungen (Morbus KÖHLER, PERTHES, SCHLATTER, etc.) werden die beiden Fälle als zu dieser Gruppe gehörig aufgefasst.

RÉSUMÉ

L'auteur rapporte deux cas d'une affection typique inédite, de l'os sésamoïde médian du premier métatarsien. Dans le premier cas le malade ne souffrait que du pied gauche, tandis que la radiographie accusait les mêmes modifications des deux côtés. Dans le second cas toutes les modifications typiques n'existaient que dans l'os sésamoïde du pied droit — avec douleurs — l'os correspondant du pied gauche formait une espèce de transition à la bipartition qui n'est pas considérée comme anormale, de los sésamoïde. Vue que l'aspect radiographique, les lésions microscopiques — dans le second cas l'os fut extirpé — et les symptômes cliniques sont conformes à ceux des ostéochondropathies (morbus KÖHLER, PERTHES, SCHLATTER etc.), les deux cas furent considérés comme appartenant à ce groupe d'affections.

RESUMEN

El autor presenta dos casos de afección típica inédita del hueso sesamoideo medio del primer metatarsiano. En el primer caso el enfermo sentía solamente molestia en el pie izquierdo, mientras que la radiografía presentaba las mismas modificaciones en ambos lados. En el segundo caso las modificaciones típicas no existían más que en el hueso sesamoideo del pié derecho, con molestias, el hueso correspondiente del pié izquierdo formaba una especie de transición a la bipartición que no se considera como anormal, del hueso sesamoideo. Puesto que el aspecto radiográfico, las lesiones microscópicas — en el segundo caso el hueso fué extirpado — y los síntomas clínicos estaban de acuerdo con los de las osteocondropatias (morbus KÖHLER, PERTHES, SCHLATTER etc.) los dos casos fueron considerados como pertenecientes a este grupo de afecciones.

UN CAS DE VULNUS SCLOPETARIUM ORBITAE

par

M. Jacob Nordentoft

Communication faite dans la réunion de la JYDSK MEDICINSK SELSKAB, 1924, à Viborg

Il a été constaté dernièrement, en Danemark, 5 accidents à peu près semblables et dûs, tous, à une même catégorie d'armes, savoir: la carabine originale « Geco », modèle 1919. Dans ces circonstances, je me suis permis de croire, qu'une démonstration radiographique de la dite lésion pourrait, peut-être, offrir un certain intérêt.

Fig. 1.

Les trois premiers cas furent publiés par le Docteur V. RIEMKE (Ugeskrift for Læger 1924, p. 284); deux de ces cas étant de Viborg, et le 3e de l'Hôpital de Odense. Le 4e cas (de Randers) a été publié par M. HARTLEV, médecin-oculiste.

Dans les cinq cas sans exception, le bloc de culasse entier a été projeté en arrière, de manière à quitter la carabine et pénétrer dans

l'orbite du tireur. Dans deux cas, la pénétration eut lieu à travers la paupière inférieure, et bien sous le globe de l'œil, de sorte que ce dernier put être sauvé, nonobstant la gravité de sa lésion. Dans le 3e cas, la pénétration eut lieu à travers la paupière supérieure, permettant, également, la conservation du globe oculaire, mais avec perte de la vision. Dans les deux derniers cas, il fut nécessaire de pratiquer l'enucléation de l'œil.

Dans le cas observé par moi (Fig. 1), le bloc de culasse, entrant par la fente palpebrale même, avait pénétré dans le globe oculaire, et l'avait poussé jusque dans la fosse temporale. Comme dans les autres cas, 4 ou 5 cm seulement du corps étranger restaient visibles au dehors des paupières, le reste étant enfoncé sous le crâne. Pour l'enlever il fallut procéder à la résection du bord orbitaire extérieur.

Le malade resta pendant quinze jours dans un état soporeux, avec le pouls lent. Puis son état commença de s'améliorer assez rapidement; et, comme les quatre autres, il finit par s'en tirer, la vie sauvée.

FROM THE ROENTGEN CLINIC OF THE BISPEBJERG HOSPITAL, COPENHAGEN
CHIEF: CHR. I. BAASTRUP

A NEW ROENTGEN STEREOSCOPE, AND A NEW METHOD OF INCREASING THE SENSE OF PERSPECTIVE

by

Chr. I. Baastrup

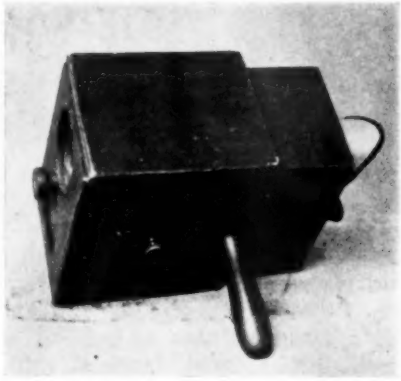
The apparatuses that are now in the market and used for observing stereoscopic roentgenograms are generally very complicated and expensive, some of them even being so large that it is difficult to find room for them in small clinics.

At my suggestion Mr. ALFRED JOHNSEN, C. E., has constructed the apparatus described below:

The eyes are looking into an ordinary pair of stereoscopic prisms, and the lens systems are contained in a small box. A screw is used for adjusting the pictures until they fuse into one image. The apparatus is very easy to use and the pictures are standing out distinct and clear.

The roentgenograms should be placed side by side in a light-box or window.

As is well known, accommodation is chiefly possible in a plane from side to side and less from above downward. This fact is illustrated by the following example: When looking at telephone wires, while the connecting-line between the eyes is parallel with the wires, we are unable to tell which of the wires are the remotest and which are the nearest. This is very often the reason why stereoscopic pictures may be easy or difficult to »get hold of». Predo-



minant horizontal lines give a bad, and predominant vertical lines a good sense of perspective. Applied to roentgenograms this means that the thorax, for instance, is a bad object for stereoscopic roentgenography with the patient in an upright position, whereas it is better when he is lying on one side, since the direction of the ribs is mainly horizontal when the body is in an erect posture. It is therefore possible to bring out better the stereoscopic depth in the thorax by drawing lines to help the eyes, that is to say, by including in the roentgenogram some vertical metal wires which are placed in front of and behind the part of the body to be roentgenographed. These wires produce a very distinct depth in the stereoscopic roentgenogram and by this means the ribs are made to stand out in their proper perspective. These thin wires are, of course, not detrimental to the roentgenograms to any extent worth mentioning.

SUMMARY

Since accomodation takes place mainly through lateral movements of the eyes, vertical lines in the stereoscopic roentgenogram produce a good and horizontal lines a bad sense of perspective.

The plan of the author is therefore to increase the sense of perspective in the roentgenogram by applying vertical metal wires in front of and behind the part of the body to be examined.

Description of new roentgen stereoscope by means of which a fine stereoscopic view can be obtained of roentgenograms placed side by side in a light-box or window.

The apparatus is small, easy to use, and cheap.

ZUSAMMENFASSUNG

Da die Akkomodation hauptsächlich durch laterale Bewegungen der Augen stattfindet, geben vertikale Linien im stereoskopischen Röntgenogramm einen guten und horizontale einen schlechten Eindruck der Perspektive.

Die Absicht des Autors ist es deshalb, den perspektivischen Eindruck des Röntgenogrammes zu verstärken, indem er vertikale Metalldrähte vor und hinter dem zu untersuchenden Körper anbringt.

Beschreibung eines neuen Röntgen-Stereoskops, durch welches der Beschauer von Röntgenogrammen, die nebeneinander in einer Beleuchtungsvorrichtung oder in einem Fenster angebracht sind, eine gute stereoskopische Wirkung erhält.

Der Apparat ist klein, leicht zu handhaben und billig.

RÉSUMÉ

Puisque l'accomodation se fait surtout par des mouvements latéraux des yeux, les lignes verticales dans la radiographie stéréoscopique fortifient la perspective plus que les lignes horisontales.

L'auteur a eu l'idée de fortifier la perspective dans la radiographie en fixant des fils métalliques verticaux devant et derrière la partie du corps examinée.

Description d'un nouveau stéréoscope pour radiographies par lequel on obtient une vue stéréoscopique nette de radiographies placées côte à côte dans une boîte éclairée ou dans une fenêtre.

L'appareil est petit, facile à manier et bon marché.

RESUMEN

Puesto que la acomodación se efectúa, sobre todo, por movimientos laterales de los ojos, las líneas verticales en la radiografía stereoscópica refuerzan la perspectiva mas que las líneas horizontales.

El autor ha tenido la idea de reforzar la perspectiva en la radiografía, fijando los hilos metálicos verticales delante y detrás de la parte del cuerpo examinada.

Descripción de un nuevo stereoscopo para radiografías, con el cual se obtiene una vista stereoscópica limpia de las radiografías colocadas de lado, en una caja iluminada o en una ventana.

El aparato es pequeño, de fácil manejo y de precio reducido.

FROM THE ROENTGEN CLINIC OF THE BISPEBJERG HOSPITAL, COPENHAGEN
CHIEF: CHR. I. BAASTRUP

A NEW APPARATUS FOR DETERMINING EXACTLY THE EXTENSION OF THE AREA OF THE PATIENT'S BODY EXPOSED TO ROENTGEN IRRADIATION

by

Chr. I. Baastrup

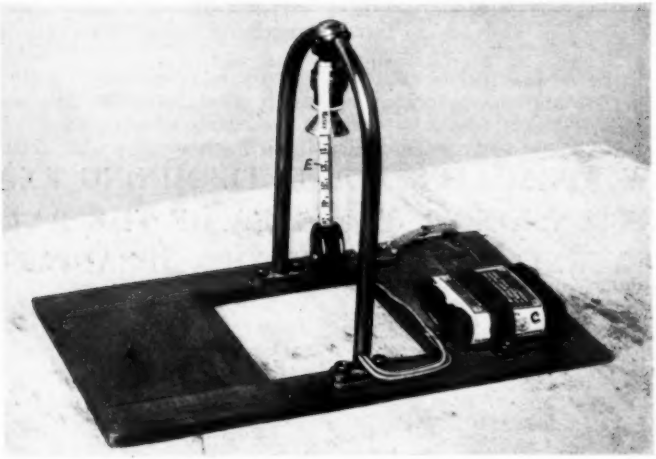
It is a very important thing to know exactly the extension of the area of the patient's body that is being irradiated during a roentgen treatment. In clinics where gas tubes are used, it is by no means an easy thing always to know the exact extension of the irradiated area, especially since the »technique of irradiation at long distances» has come into use more and more, which method sometimes requires one and sometimes another skin-focus distance.

I am not going to enter here into the particulars of the various methods, most of which are inexact or rather complicate.

The apparatus described below, which I have constructed, has been used by us every day for eighteen months in the roentgen clinic of the Bispebjerg Hospital, and has proved practical and easy to employ.

The box that carries the therapy tube is made in such a way that the roentgen tube which is fixed to a board of cross-veneer can be pushed from one end into the oblong tube-box. The tube is held by two vertical holders on the board, in relation to which it is carefully centred.

On a board A of exactly the same size as the board carrying the tube a small electric bulb B is placed at a point corresponding exactly to that occupied by the anti-cathode of the roentgen tube on the tube-board. The board is further fitted with a small electric storage battery C and a contact-point D which lights the lamp automatically when the board is slid into the tube-box. In addition, a self-winding tape-line, on which the standard measurements (23 cm., 46 cm., and so on) are the most marked, is fitted directly to the lamp. By means of this tape-line the skin-focus distance is to be measured.



The cone of rays from B will irradiate exactly the same area of the patient's body as the roentgen tube that is fitted in later on — quite independent of the skin-focus distance or of whether a diaphragm is used or not.

The apparatus is very easy to use, and cheap.

SUMMARY. Description of a small simple apparatus which serves to indicate the exact area on the patient's body that will be exposed to the roentgen rays.

This is accomplished by placing an electric bulb at exactly the same point where the anti-cathodal focus of the roentgen tube will be during the exposure.

ZUSAMMENFASSUNG. Beschreibung eines kleinen einfachen Apparates, der dazu dient, genau das Gebiet vom Körper des Patienten anzugeben, das den Röntgenstrahlen ausgesetzt werden wird.

Dies wird dadurch bewirkt, dass eine elektrische Glühlampe genau an demselben Punkt angebracht wird, wo sich der anti-kathodale Fokus der Röntgenröhre während der Exposition befinden soll.

RÉSUMÉ. Description d'un petit appareil simple qui sert à indiquer la surface exacte du corps d'un malade que l'on veut exposer aux Rayons X.

Ceci s'obtient en plaçant une lampe électrique exactement à l'endroit même où le foyer anti-cathodique sera situé pendant l'exposition.

RESUMEN. Descripción de un pequeño aparato sencillo destinado a indicar la superficie exacta del cuerpo de un enfermo que quiera exponerse a los Rayos X.

Esto se obtiene colocando una lámpara eléctrica exactamente sobre el lugar mismo donde el foco anti-catódico será colocado durante la exposición.

NEWS ON THE BOOKSHELF
OF ACTA RADIOLOGICA

Herbert Assman: Die Klinische Röntgendiagnostik der inneren Erkrankungen. Publ. F. C. W. Vogel, Leipzig, 1924.

A. Bacmeister & L. Rickmann: Die Röntgenbehandlung der Lungen- und Kehlkopftuberkulose. Publ. Georg Thieme, Leipzig, 1924.

I. Cohn: Normal Bones and Joints. Annals of Roentgenology IV. Publ. Paul B. Hoeber, New York, 1924.

Fr. Dessauer: Dosierung und Wesen der Röntgenstrahlenwirkung in der Tiefentherapie. Strahlentherapeutische Monographien II. Publ. Theodor Steinkopf, Leipzig, 1923.

A. W. George & R. D. Leonard: The Pathological Gall-Bladder. Annals of Roentgenology II. Publ. Paul B. Hoeber, Inc. New York, 1922.

Rud. Grashey: Atlas chirurgisch-pathologischer Röntgenbilder. Publ. J. F. Lehmann, München, 1924.

S. Gräff & L. Küpferle: Die Lungenphthise, 2 vol. Publ. Julius Springer, Berlin, 1923.

S. Hirsch: Die peripheren Blutgefässe im Röntgenbild. Publ. Keim & Nemnich, Frankfurt a. M., 1924.

G. Holzknecht: Röntgentherapie. Publ. Urban & Schwarzenberg, Berlin, 1924.

G. W. C. Kaye: X Rays. Publ. Longmans, Green & Co., London 1923.

C. G. Kerley & L. Th. Le Wald: Digestive Disturbances in Infants and Children. Annals of Roentgenology III. Publ. Paul B. Hoeber, New York, 1923.

Robert Knox: Radiography and Radio-Therapeutics I. Publ. A. & C. Black, London, 1923.

Paul Krause: Handbuch der Röntgentherapie I. Publ. Werner Klinkhardt, Leipzig, 1924.

F. M. Law: Mastoids, Annals of Roentgenology I. Publ. Paul B. Hoeber, New York, 1921.

Memorial Hospital, New York: Clinical Studies 1919—1923. Laboratory Studies 1919—1923. Radium Report, 2nd series 1923. Publ. Paul B. Hoeber, Inc. New York.

H. Rieder und J. Rosenthal: Lehrbuch der Röntgenkunde, Band 1. Publ. Johan Ambrosius Barth, Leipzig, 1924.

G. Richl & L. Kumer: Radium- und Mesothoriumtherapie der Hautkrankheiten. Publ. Julius Springer, Berlin, 1924.

Amy F. Rowland: The Thyroid Gland, Clinics of George W. Crile and Associates. Publ. W. B. Saunders Co., Philadelphia, 1922.

P. Salzmann: Röntgenbehandlung innerer Krankheiten. Lehmanns medizinische Lehrbücher VI. Publ. J. F. Lehmann, München, 1923.

W. E. Schall: X Rays, their Origin, Dosage, and Practical Application. Publ. John Wright & Sons, Bristol, 1923.

Herman Wintz: Die Röntgenbehandlung des Uteruskarzinoms. Publ. Georg Thieme, Leipzig, 1924. Die Röntgenbehandlung des Mammarkarzinoms. Publ. do. H. Wintz & R. Dyroff: Das Pneumoperitoneum in der Gynäkologie Publ. do.

ACTA PATHOLOGICA

A New Member in the Circle of Actas

The first number af Acta Pathologica et Microbiologica Scandinavica will appear in the month of December 1924.

This journal is to be published on the same scheme as previously issued journals of »Acta», by the Pathological Societies of Denmark, Finland, Norway, and Sweden, and is intended to be the organ of Pathology, Pathological Anatomy, Physiology, Medical Microbiology, Serology, Veterinary Pathology and Comparative Pathology. It will contain besides original articles a section for reviews, where a complete summary of Scandinavian scientifical work on above mentioned subjects will be given. On this broad basis the journal ought to have every chance, not only of forming a desirable addition to the collection of Actas, but also from a theoretical point of view of treating numerous subjects, which in other respects are discussed on the clinical pages of this series.

The Editorial Board of the journal consists of two members from each one of the Scandinavian countries i. e.

Prof. Fibiger and Prof. Thomsen (Denmark), the latter Chief Editor, Prof. Streng and Prof. Wallgren (Finland), Prof. Harbitz and Docent de Besche (Norway), Prof. Forssman and Prof. Sjövall (Sweden).

The journal will be published by Messrs Levin & Munksgaard, Copenhagen, and the terms of subscription are Danish Crowns 25: — per volume of four numbers (of at least 6 sheets each).

We feel convinced that this new link in the chain of Actas will in a worthy way join with the already existing ones and become indispensable to the library of every pathologist and bacteriologist.

Für die Verbreitung folgendes Aufrufes ist in den Acta Raum ersucht worden:

AN DIE HERREN RADIOTHERAPEUTEN DES AUSLANDES!

In der Absicht, einen möglichst engen Zusammenschluss insbesondere der Radiotherapeuten der Welt herbeizuführen, dem deutschen Radiotherapeuten die Arbeiten des Auslandes zugänglich zu machen — und vice versa — habe ich September 1924 den I. Band der Besprechungen aller mir zugänglichen Arbeiten der ausländischen Literatur (nur Radiotherapie nicht Radiologie, die beim Index in ihrer Gesamtheit in Betracht kommen wird) unter dem Titel „Radiotherapie des Auslandes" als Sonderheft der „Strahlentherapie" herausgegeben.

Diese Neuerung hat Beifall gefunden, deswegen setze ich sie fort.

Die ausländischen Herren Autoren werden auch in ihrem eigenen Interesse gebeten, mir alle ihre Neupublikationen ab Januar 1924 in Gestalt von Separaten zu senden, damit ich die Besprechungen ausführen kann.

Der nächste Band „Radiotherapie des Auslandes II" kommt Anfang des Jahres 1925 zur Ausgabe.[1]

Da mein erster Band keinen Anspruch auf Vollständigkeit machen kann, möchte ich diesen Fehler nach Kräften gutmachen och möglichst alle fremden Arbeiten erreichen. Das kann ich nur dann, wenn mich die Herren Autoren selbst mit Literatur versehen.

Übrigens wird nach dem ausgezeichneten Vorschlage des Herrn REGAUD, eines der französischen Herren Protectoren des zu gründenden Indexfundus, erwogen, späterhin den Referatenaustausch bez. *aller* Arbeiten auf radiologischem Gebiet mit Hilfe des „Index radiologorum" d. h. der Mittel des Fundus in grosszügiger internationaler Form auf dem Wege der bisher existierenden Zeitschriften zu bewirken.

Hochachtungsvoll

Dr. Wetterer, Mannheim O 2, 1 (Deutschland)

Spezialarzt für Haut- und Harnkrankheiten, Röntgen-, Curie- u. Lichttherapie: Verfasser des „Handbuches der Röntgen- u. Radiumtherapie" und der „Radiotherapie des Auslandes", Begründer des „Index radiologorum".

[1] Von allen Arbeiten, die nicht in dänischer, deutscher, englischer, französischer, italienischer, norwegischer, schwedischer, spanischer Sprache geschrieben sind, erbitte ich mir ausführliche Autoreferate in einer dieser genannten Sprachen. *Dr. W.*